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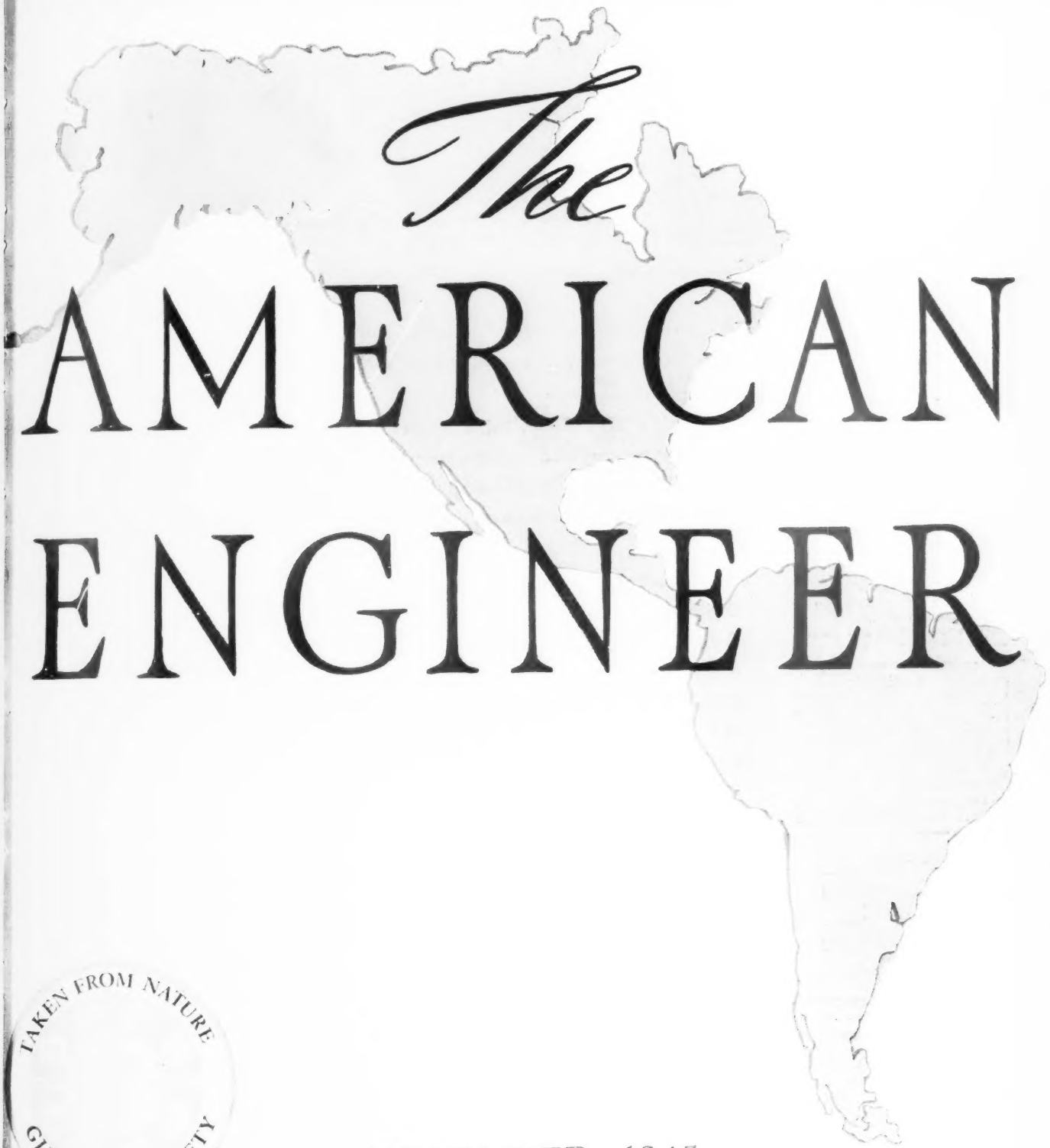

The AMERICAN ENGINEER

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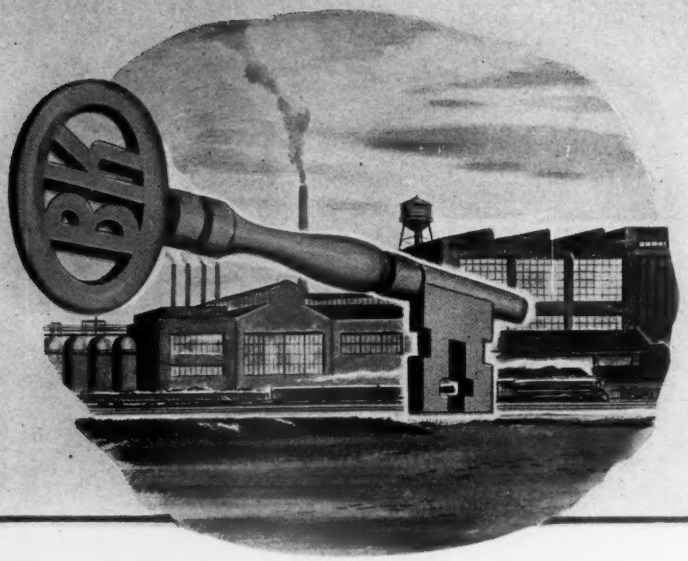
DECEMBER, 1945



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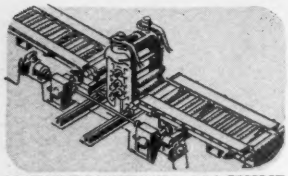

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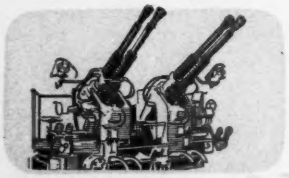

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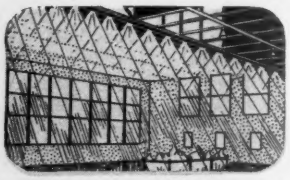

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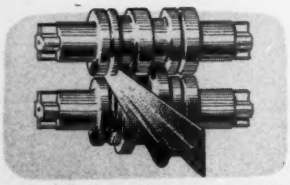

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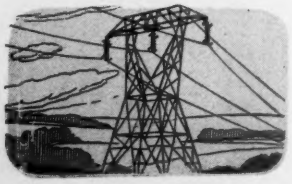

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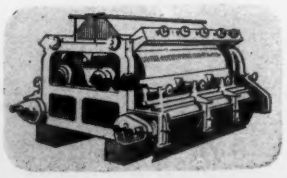

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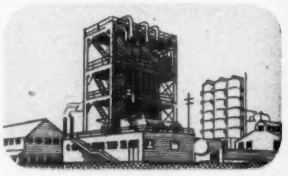

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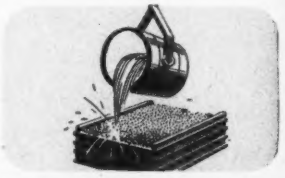

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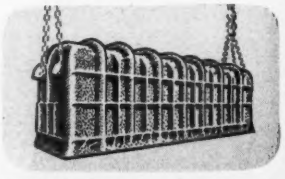

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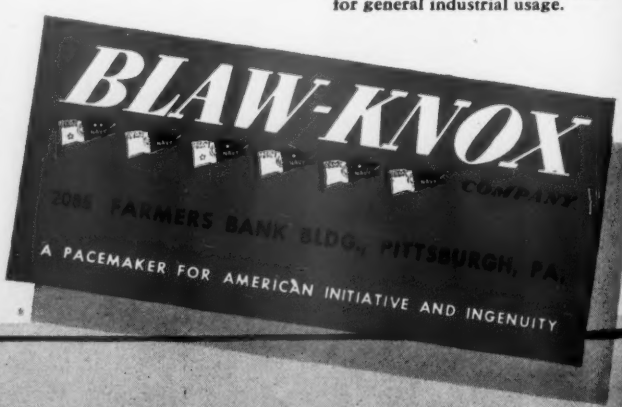

THE AMERICAN ENGINEER

Published monthly in the interest of the Engineering Profession by the National Society of Professional Engineers.

VOLUME 15, NUMBER 12

DECEMBER, 1945

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All editorial material should be sent to the Washington Office.

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Subscription Rates

$1.00 per year in advance to members of the National Society of Professional Engineering and its Affiliated Societies. $2.00 per year in advance to non-members in U.S.A. and its possessions and Canada and Mexico. Single copy — 25c. Foreign, $4.00 per year.

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Change of address on Form 3578 should be sent to the National Society of Professional Engineers, National Press Building, Washington, D. C.

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Reentered as second class matter, March 11, 1942, at the Post Office in New York, under the Act of March 3, 1879.

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Personal and Personnel Problems of Engineers

My discussion in this issue of The American Engineer will be divided into three parts: first, "What Industry Expects of the Individual Engineering Employee"; second, "What Engineering Employees Expect of Industry"; and finally, "Collective Bargaining for Engineers".

I should like to make it clear that my remarks represent my own personal views and have no connection with any organization, engineering or otherwise. I should also like to emphasize the fact that these views do not reflect the unique experience of any one plant or company. For a number of years, I have been particularly interested in engineering personnel problems, as a sort of hobby, and have discussed these matters with many engineers and executives in various industries all over the country.

Industrial Engineer's Psychology

Recently, I have had a rather unusual opportunity to study the psychology of industrial engineering employees, as a member of a committee elected by some 400 engineers in a large eastern plant to investigate the entire question of collective bargaining. At the same time, I was chairman of another committee whose function was to prepare agenda and minutes for a series of "Informative Group Luncheons", attended by representatives of management and various groups of engineers, which were held from one to three times weekly for the purpose of discussing company policy and personnel problems. Discussions with engineers in other eastern, middle western, and Pacific Coast plants have revealed a very uniform attitude toward most of these points.

All of this is mentioned simply to indicate that these are reasonably well-founded observations.

What Industry Expects

Now, "What does Industry expect of its engineering employees"?

I'll try to itemize the answers as briefly as possible. Most of them are well-known, but not always remembered:

1. *Loyalty*—careful regard for the Company's interests and a genuine interest in the Company's success, as if it were your own business. No derogatory remarks, in private or in public.

2. *Enthusiasm*—for the Company, your boss, the job. Otherwise you'd better consider a change, preferably within the Company, or else work to correct or improve conditions, if at all possible.

3. Full application of time and energies to Company business. Leisure time should be used for hobbies and recreation—*not* in conducting a private business enterprise requiring appreciable effort. Punctual attendance and accurate accounting for lost time are expected.

Assignment of Patents

4. Definite *contributions* to the Company's or departments program, or toward the solution of problems, or creation of new products or methods. In appropriate cases, such contributions should be protected by *patents* assigned to the Company.

5. Consistent application of initiative, resourcefulness and persistence in starting, planning and completing your assignments and projects.

6. You will be expected to *cooperate* with your associates—help them and let them help you. Promote *teamwork*. Have due regard for organizational boundaries and other people's territories.

7. Keep your supervisor informed of all significant developments.

8. Finish your assignments *on time* and within reasonable distance of your budgeted expense.

9. Record or report your results in suitable form, so that other interested parties will derive immediate benefits and nothing will be lost if you are not there later on.

Virtue It's Own Reward?

If all of this is done within reasonable limits of consistency, quality, time and cost, your boss will be sorely tempted to give you larger assignments and rewards. (It may also establish somewhat of a precedent!).

10. As a representative of your Company, you will be expected to be *reasonably* careful of your personal appearance.

11. You will also be expected to maintain a high standard of personal and professional ethics—*off* the job as well as on the job. Perhaps your *private* affairs are not part of the Company's business, but your *social* conduct is, all of the time.

Turning now to—

"What Engineering Employees Expect of Industry"—

Salary Isn't Everything

There is a very common tendency to over-simplify the answer to this question by saying that, mainly, they want more salary than they're getting. Of course, they want a good salary, but they want a great deal more than that. Here is a list of some of the things a *representative* engineer expects from management:

1. *Leadership,* in the best sense of the term—not paternalism on the one hand or neglect—disguised as "com-

Editor's Note

This thought-provoking discussion has been written under the sponsorship of the Publication Committee of the National Society of Professional Engineers with the purpose of bringing some of these issues out into the open for further clarification.

It is the judgment of the Committee that the observations presented, as well as the data from which they have been drawn, are well documented and based on sound reasoning and seasoned experience.

In the opinion of the Editor, the views here expressed are in themselves, and without particular reference to the identity of the author, well worth the careful consideration and study of our readers.

Comments on any of the points raised, whether for publication in The American Engineer or not, will be welcomed by the Editor. If you have well considered views on any phase of this general subject, we would like to be able to pass them on to other members of the National Society of Professional Engineers.

plete freedom of action" on the other —but *guidance* in respect to major objectives and plans, *inspiration, encouragement,* and *stimulation.*

2. Not merely *protection,* but *promotion* of their professional and personal interests, at every opportunity.

3. Clear-cut assignments and responsibility.

4. The tools for the job, *good* ones.

5. *Information* concerning the background, present status and future policies and programs affecting their work.

6. *Information* on Company policies, rules, organization, practices.

Wants Check-Up

7. *Information* as to how they're getting along in their work and whether their performance is regarded as satisfactory, or how it could be improved.

8. *Information* on methods of rating individual engineers.

9. *Information* regarding engineering salaries for various ratings and lengths of service. It may not be regarded as advisable to release this, but the men *want it,* nevertheless, and they will frequently obtain it by their own resources, if not officially. They particularly want to know how their salary curves compare with those of engineers in other plants and comparable competitors in the industry and with wages of less skilled workers.

10. *Fair salaries*—all that the business should justify under *efficient* management—judged in relation to other groups as above.

11. Full information on other benefits and compensations. They must be *sold* on these.

Competent Supervision

12. Evidence of *interest* in the work of individual engineers, as expressed by periodic reviews and appraisals; *constructive criticism* as well as praise; maintenance of *discipline* and accountability, instead of laxity and indifference.

13. Information on the technology of a man's particular field—from the literature, educational courses, attendance at professional society meetings and *contacts* with other plants, laboratories and field installations.

14. *Good* working conditions—ventilation, light, air conditioning; control of noise and dirt, well-maintained buildings, modern furnishing and facilities. Present-day engineers pay a surprising amount of attention to these things.

15. Freedom from petty annoyances, red tape, nuisance chores, parking lot rentals, too much fuss about *occasional* tardiness after working overtime.

Freedom of Speech

16. Opportunity to express themselves in publications and attendance at technical meetings, to obtain some measure of recognition in their profession.

17. Reasonable stability of organization. Advance information as to why they are moved abruptly from one job to another. Square pegs in *square* holes.

18. Minimum of buck-passing by management—maximum local autonomy in handling personnel matters.

19. Opportunity to improve professional effectiveness and to advance on the basis of merit and individual effort.

20. Opportunity to discuss personal problems directly and privately with higher executives as well as immediate superiors—to feel that no one is blocking their way. Opportunity to advance by transfer to other departments or companies if not in their present job—especially when they have outgrown their present job.

Grievance Procedure

21. Effective procedure for adjustment of grievances; including *group* discussions of common grievances.

22. Liberal policy in respect to sick leave, time off for personal business, and vacations.

23. Other benefits such as group life and hospital insurance, pension plan, salary allotment payments for such items.

24. Opportunity for improving the professional standing and sociological status of the engineer, in collaboration with other engineers throughout the nation.

25. Participation by democratic processes in the formulation of Company policies directly affecting them,—at least to the extent of having a voice, collectively, in discussions, and some means for determining their own group opinions on important issues—such as,

Collective Bargaining

Why should there be any occasion for Collective Bargaining?

The occasion arises whenever management not only falls too far short of living up to what the engineers expect of it, but also fails to take the initiative in providing adequate means for individual and group discussions of these matters. The employees are very apt to take the initiative in this respect, if management does not.

However, it is *difficult,* to say the least, for management to do all of these things, even when it has the interest and the best of good intentions. The difficulty is about in proportion to the size of the organization, and is aggravated by rapid expansions and pre-occupation with urgent war projects. Industry simply does not have enough executives and supervisors with the necessary interest, personality and training to handle these personnel problems properly *along with their technical and business problems.*

Special Talent Required

Special training of supervisory personnel will help materially and has been receiving much attention of late. But *training* alone frequently will not suffice—some executives just do not have the proper personality or talent —the more they talk the worse matters become.

For this reason, it is frequently advisable, in any fair-sized organization, to appoint special "managers", or "Administrative Assistants" to relieve the technical director or Chief Engineer of this burden. In large engineering units a top-notch *engineering* personnel director with an adequate staff spending *full time* on these matters can sometimes accomplish exceptional results.

The Wagner Act

The fact remains that all too often the employees come to the conclusion that no one except *representatives of their own choosing* can be trusted at all times to maintain a vigilant and enthusiastic interest in their personal welfare. In such cases, when it has been agreed that some kind of organization is wanted, the first problem is to select the appropriate medium. At this point, it is advisable to consider certain features of the Wagner Act which bear directly upon this question.

The avowed purpose of the Wagner Act is "to encourage the practice and procedure of collective bargaining, and to protect the exercise by workers of full freedom of association, self-organization and designation of representatives of their own choosing for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection". It is the duty of the National Labor Re-

lations Board to interpret and carry out the provisions of the Act.

Pertinent Facts of Law

Following are some pertinent facts concerning the Board and the law:

1. Upon petition by a substantial group the Board will hold an election to determine and certify what organization shall represent an "appropriate unit" of employees for collective bargaining purposes. The result is determined by a simple majority of those voting and cannot be challenged and brought to a vote again for a period of one year.

2. The Board has the power to designate what individuals shall be included in the "appropriate unit", after which *all* such individuals, e.g., engineers or foundrymen, will be represented by the certified organization regardless of their individual wishes.

Defines "Appropriate Unit"

3. The law, as interpreted by the Board, excludes from an "appropriate unit" all supervisory personnel "who have the authority to hire, promote, discharge, discipline or otherwise effect changes in the status of such employees or whose official recommendations concerning such actions are accorded effective weight".

4. The Board has determined that an "appropriate unit" must be comprised of individuals with a "mutuality of interest", who can work harmoniously together, but this refers to *types* of employees, rather than to individuals in a type.

4. The law requires that the employer must bargain in good faith with the certified agency, without interference or discrimination in any form. The terms of the contract, usually affesting such items as maintenance of membership, sick leave, seniority, wage rates, job classification, etc., are determined by mutual agreement between the employer and the agency without participation by the Board, but the contract is binding upon *all* members of the "appropriate unit" regardless of their membership in the certified agency.

Guarantees Against Discrimination

6. It *may* be one of the terms of the contract that the bargaining agency alone shall have the power to make all agreements with the employer. Although the law provides that the individual employee has the right to present his grievances to his employer, the bargaining agency often insists that no decision shall be made without prior agreement with the agency on the point at question or except in the presence of one of its representatives. This latter provision is demanded to guarantee against discrimination.

Who May Represent

7. It is entirely possible for any type of engineering group or organization to undertake to represent its membership either in discussions with management or in informal "cooperation" with management without benefit of legal certification and without any attention from the NLRB, so long as it is not effectively challenged by a competing labor group.

The competing group may claim the exclusive right to represent the engineers, or it may bring charges of "unfair labor practices" involving collusion or discrimination against the employer. To avoid such a possibility, either the employer or the engineers may insist upon a legally certified status, or else upon a completely informal status wherein there are no official transactions that might possibly be interpreted as "bargaining".

The Alternatives

In the light of the foregoing, a light which is not always shed upon the matter in advance, engineers may select one of the following alternatives, if they have decided to choose their own representation:

First, there are the national, altogether technical engineering societies —A.S.M.E., A.I.E.E., A.C.S., etc. Practically without exception, it is agreed that these societies will not serve the purpose since their membership includes management as well as "labor".

The shop unions A. F. of L., C.I.O., and their affiliates are conveniently at hand and sometimes attract the younger or more disgruntled engineers, especially when the issues and the alternatives have not been presented clearly to them. The simple fact is that the basic interests, problems, and psychology of engineers do not coincide with those of shop workers. The NLRB has recognized this in a number of cases where it has ruled that a shop union was not an "appropriate unit" to represent engineers and other professional employees. Some of the more enlightened unions also have recognized this and have urged engineers to form their own unions.

Against Union Affiliation

The engineers themselves have voted overwhelmingly against any sort of affiliation with a labor union in a striking number of instances. For example, it is reported[1] that in a recent poll of Canadian engineers on the question of collective bargaining, the vote was 2,150 to 15 against representation by a trade union. The writer has observed similar sentiment in this country in several significant instances where the issues have been ventilated adequately.

An independent certified collective bargaining unit is another alternative, and here there is more room for argument. In fact, there *has* been a great deal of argument and testimony on both sides of this particular question. The chief advantage of such a legalized status is that it fixes the negotiations on a solid, definite basis with the least likelihood of disturbance by labor unions or embarrassment by the Wagner Act.

Legalisms An Objection

The big objection to it is that it almost inevitably "freezes" all negotiations between engineers and management into a stiff, formalized legal mold, usually covered by a ponderous, carefully drawn contract. A year or two may be required to work out and agree upon all of the terms of the contract—even when the bargaining is in perfectly good faith. And it establishes an awkward fence between all supervisors and their men.

However, it should be noted that this is not an inescapable consequence of the certified status, and this status is sometimes resorted to by engineers in order to protect themselves from inclusion in other organizations. In such cases, it is quite possible that there will be no formal contract, or else a very loose and flexible one. On the other hand the employer may be forced to take the position that he can make no distinction between a shop union and an engineers' union, so long as the latter is on a legally certified basis, in respect to policies and procedures.

Less Formal Medium Preferred

Talks with many engineers employed in industry together with the results of several ballots involving thousands of votes, have convinced me that the majority of such engineers prefer to

avoid legalized collective bargaining procedure if they are offered a satisfactory option in a less formal medium.

Moreover it is my conviction that in any reasonably well-managed industrial unit where the future is relatively secure and there is normal opportunity for advancement on the basis of merit, the engineers will prefer to *cooperate* collectively with management rather than to *bargain* collectively.

Engineer "Councils"

This attitude has led to the formation of several engineers' associations for the purpose of promoting the *mutual* interests of the Company and the engineers, primarily by developing, collecting, and transmitting information in both directions. Such an association usually functions through a "Council", made up of representatives elected by the various units of the plant or company.

By choosing their own representatives in this manner, the men can be assured of having spokesmen with whom they can discuss their questions and grievances freely, without embarrassment or fear of consequences. *Occasionally* a department head will win the confidence of his men to such a degree that they will feel free to talk perfectly frankly in his presence, but usually the very atmosphere of an executive office has an inhibiting effect.

Without Company Participation

In order to avoid embarrassment under the Wagner Act, some organizations of this type have adopted the practice of transacting all of their activities, including the publication of periodic bulletins, entirely independent of any Company facilities, assistance or participation in any manner. At its option, the management may take note of questions, suggestions or resolutions made public in this manner and may transmit comments, to members and non-members alike, through the regular channels of the company organization. In at least one instance it has been deemed necessary to exclude all supervisory personnel from membership in the association. This has the advantage of promoting maximum freedom of expression, but may sometimes exclude very able and sincere champions of the engineers' interests.

Regardless of where the line is drawn, early experience with this relatively new type of procedure appears to be quite satisfactory to all concerned. It will doubtless be refined and stabilized further after more extended experience, or it may be possible ultimately to effect a revision of the Wagner Act to render this "double channel" technique unnecessary when there is obviously no desire to "bargain" in the usual sense.

Company Suspicions

It is perhaps only natural for management to regard any type of engineers' organization, whatever its avowed objectives may be, with considerable suspicion and to feel that all of its proper aims could be accomplished through the existing Company set-up. here is a common tendency to jump to the conclusion that *any* type of collective activity must necessarily assume the character and tactics of a labor unit, sooner or later.

This suspicion and distrust is completely unjustified in respect to engineers generally, so long as management does its share to merit their confidence and cooperation. Most engineers appreciate the fact that their individual interests are closely bound up with those of the Company, and in this spirit they can render unique services to management in accurately gauging group opinions through the medium of their own agencies, and in other respects.

Suggests Informal Group

Until some demonstrably better machinery is devised, it may well be that an independent, uncertified association of this character is the best answer to the engineers' search for an appropriate organization for promoting their interests, when the need is apparent.

Whatever form it may take, it seems highly desirable that the unit should be strictly homogeneous in its membership, i.e., restricted to engineers who have clearly attained professional status,—doubtful cases to be determined by a Membership Committee. Complete "mutuality of interest" is important to avoid dilution and internal dissentions. It may later be found desirable for the local unit to affiliate with the National Society of Professional Engineers, whose headquarters are in Washington, D. C.

The real danger in the formation or operation of an engineers' organization in an industrial unit lies in the possibility that the men may suddenly be required to vote in an election where the true issues and options are not properly defined and illuminated. This has happened more than once, with unfortunate results. .

Education Needed

The danger is heightened by the fact that the employer cannot attempt to enlighten the men or to express any official attitude, even when requested, without being liable to charges of intimidation or domination, in violation of the Wagner Act. This gives the advocates of any kind of union a rather unfair advantage. Here is the manifest opportunity and duty of the National Society of Professional Engineers and other engineering societies, who should certainly take the initiative in guiding their members in their thinking with respect to these questions.

It was reported in "Mechanical Engineering" last December that a subcommittee of the ECPD had been requested to consider the propriety of formulating principles for this purpose, but the committee was unable to hold a meeting because of war conditions. This is all the more regrettable in view of the fact that war conditions have caused a marked increase in unrest and precipitate action among engineers. It is very much to be hoped that all Professional Engineering Societies working closely together, will presently find a way to illuminate this entire subject, so that all engineers and their employers will be adequately informed and advised.

It has been said that when the engineer enters his laboratory, or approaches any highly technical problem, he immediately takes on the scientific point of view. Unfortunately, however, for the engineering profession and for society, when the average technically trained man leaves the environment of his profession, he thoughtfully lays aside his scientific attitude as though it were a cloak. Too often he then allows himself to become influenced by the unreasoning and emotional reactions of the market place and of pressure group politics. America could well use to great advantage the type of statesmanship which the peculiar training of the professional engineer abundantly qualifies such men to demonstrate.

It is estimated that 20 billion dollars of foreign loans have been defaulted during the past 30 years.

(1) *See Article on "Employment Conditions for Engineers," Mchanical Engineering December, 1944, p. 809.*

Legislative Committee Comment

"Eternal Vigilance is the Price of Liberty"

S-1462—10/2/45 (Barkley) Referred to the Committee on Commerce.

HR-4070—9/14/45 (Spence) Referred to the Committee on Rivers and Harbors. "To provide for water-pollution-control activities in the United States Public Health Service, and for other purposes."

These are identical bills, and are of particular interest to NSPE in that Sec. 5 says "The Federal Security Administrator is authorized to extend Federal aid in the forms of grants-in-aid, loans, or both, to any state, municipality, or other public body, for the construction of necessary treatment works to prevent the discharge by such state, municipality, or other public body of untreated or inadequately or inadequately treated sewage or other waste into the surface or underground waters in or adjacent to any state, and for the preparation (either by its engineering staff or by PRACTICING ENGINEERS employed for that purpose) of engineering reports, plans, and specifications in connection therein . . ."

This is one of the first bills we have seen in this session of Congress that takes cognizance of the "practicing engineer."

The National Society of Professional Engineers' Legislative Committee has gone on record with the Honorable J. J. Mansfield, Chairman, Rivers and Harbors Committee, as favoring this bill and commending the recognition of the "practicing engineer." Also, to Senator Barkley and Representative Spence who introduced them in Congress.

We need more of this!

Where Vigilance Is Needed

The House of Representatives has accepted and passed, subject to joint-committee adjustment, S-2, the McCarran Bill on "Federal Aid for Airports". Similar in intent to the "water-pollution-control", this bill as passed did not give recognition to the "practicing engineers", but vested vast authority in C. A. A., where, conceivably, plans and specifications can be prepared, instead of being done by local governmental authority or the "practicing engineer". And, unfortunately, unless we are prepared to fight for our rights as registered professional engineers, it is apt to be done that way.

In this connection, "Eternal Vigilance" will have to be exercised by the State Societies and their local chapters if they are to receive the recognition legislated to them under the laws of their states.

Question

Up to date of November 7, the number of the last Senate Bill introduced at this session was S-1554; the last in the House was HR-4580.

Do you wonder why we must have more than just a voluntary effort to safeguard the interests of the Professional Engineer?

Registration Law Comparison

(*continued from previous issue*)

"Definition—Engineer In Training"

Georgia—New Law:

The term "Engineer-in-Training" as used in this Act shall mean a candidate for registration as a professional engineer who is

(a) A graduate in an approved engineering curriculum of four years or more from a school or college approved by the Board as of satisfactory standing; or

(b) Who has four years or more of experience in engineering work of character satisfactory to the Board, and who, in addition, has successfully passed the examination in the fundamental engineering subjects prior to completion of the requisite years of experience in engineering work.

(c) Who shall have received from the Board, as hereinafter defined, a certificate stating that he has successfully passed this portion of the examination as provided in Section 24 of the Act.

Section 24: The Board shall issue to each applicant upon successfully passing the examination in fundamental engineering subjects a certificate stating that he has passed the examination and that his name has been recorded as an "Engineer-in-Training". Provided that no Engineer-in-Training certificate will be issued in those cases where the applicant successfully passes examinations in fundamental engineering subjects, as well as his advanced specialized engineering work and is granted a license as a Professional Engineer.

Pennsylvania—New Law:

"Engineer-in-Training" means a candidate for licensure as a professional engineer who has been granted a certificate as an engineer-in-training by reason of graduation from an approved institution or college, or after successfully passed the prescribed written examination in fundamental engineering subjects, and who shall be eligible upon the completion of the requisite years of experience in engineering under the supervision of a professional engineer, or similarly qualified engineer, for the final examination prescribed for licensure as a professional engineer.

Illinois—New Law:

No provision for engineers-in-training.

Requirements for Registration

Engineer-in-Training

Georgia—New Law:

See definition—Engineer-in-Training.

Pennsylvania—New Law:

To provide for and to regulate the examination of any person who has had four or more years experience in engineering work and who produces satisfactory evidence to show knowledge, skill and education approximating that attained through graduation from an approved institution or college, and to issue to such person who successfully passed this portion of the professional examination and is recognized as an engineer-in-training. The examination of applicants as engineer-in-training shall be designed to permit an applicant for licensure as a professional engineer to take his examination in two stages. The examination for certification as an engineer-in-training shall be for the purpose of testing the applicant's knowledge of fundamental engineering subjects including mathematics and the physical sciences. Satisfactory passing of this portion of the examination shall constitute a credit for the life of the applicant, or until he is licensed under this act as a professional engineer.

Any person who is a graduate in engineering from an approved institution or college having a course of four years or more in engineering shall be

(*Continued on Page* 10)

EDITORIALS

Another Type of "Adequate Fees"

Every engineering magazine we read now-a-days, which is devoted to the social and economic advancement of the Profession of Engineering, has something to say about the decisions being made by engineers, as to what sort of schedule of fees for engineering services should be advocated by the profession.

That is as it should be. An engineer is paid in large part for what he *knows,* of efficient design, of avoiding costly mistakes in judgment, and of holding down costs to the minimum. Those who engage the services of engineers, should understand that usually they get no more than they pay for.

That idea has another application which is mighty important at the moment. The National Society of Professional Engineers has increased its annual dues, effective in the year 1947. That increase was abundantly justified, in the judgment of the Society's Directors and Executive board, because of the vastly expanded program planned for the Society, starting at once.

Membership in the Society is certain to double and treble in the next few years. The past record indicates as much, but more than that, the job ahead for the Society *demands* that it do a job many times as big and as *expensive* as anything ever before attempted.

The higher dues program deserves your wholehearted support. Couple this support with your active participation in the work of your Chapter, and you cannot fail to be personally rewarded richly.

What Hinders Production?

During the week, President Truman had this to say about America's capacity to produce: "It is technically possible to produce enough material goods so that all men everywhere may be adequately fed, decently housed and comfortably clothed."

In a recent letter the Chief Executive said: "The question is whether our arrangements for exchange and distribution will be such that these enormous productive powers are enabled to operate freely for the benefit of everyone."

The "arrangements for exchange," of which the President writes, in reality are actually our society's bookkeeping system. It would seem rather interesting to the engineering type of mind, that our accounting set up, as Mr. Truman suggests, may not permit us to produce all the things we could so easily produce by means of our technological equipment.

What would any large industrial institution do with its accounting system, once it discovered that the system itself was seriously interfering with the firm's ability to distribute its product?

"The Science of Scarcity?"

In this connection, one of the young ladies in the office, has just shown us a definition of "economics," as given to her by a professor at one of Washington's great universities, where she is taking an evening course on the subject. According to this instructor, "Economics is the science of the distribution of *scarce means.*"

It appears what the professor calls the "means"—(of subsistance) have to be kept (relatively) scarce, or they cannot be profiably distributed at prices that guarantee a reasonable profit.

And some folks (surely not engineers) wonder why we have recurring "shortages," which we call "depressions."

"Fool's Gold?"

Down in Fort Knox the government is spending a sizeable sum each year in guarding some 20 billions worth of gold bullion. Most of this hoard represents what we received in payment for physical wealth shipped out of this country—the output of our mines mills, factories and farms—real useable wealth, things capable of contributing to the living of the people.

Contained as a part of this physical product represented by the gold buried in Fort Knox, is the managerial skill, the engineering and scientific technology which went into the production of the goods and services that have been shipped abroad.

Was It A Good Deal?

From any scientific or engineer point of view, what Americans must have deprived themselves of in order to acquire so much precious (?) metal, must look like a series of financial transactions of doubtful sagacity. From any cold-blooded, utilitarian, fact-facing standpoint, the thoughtful engineer may well ask himself, "of what real value to us are those thousands of tons of yellow metal, which have been dug out of one hole in the ground at great labor and expense, and then deposited in another equally expensive vault beneath the earth's surface?"

The answer, if any, resides in the realm of abstract economics, certainly not in any realm even remotely related to hard-headed realism. Legally, gold may not be spent within the boundaries of the United States. As a medium of foreign exchange, also it would appear to be utterly useless. For it is inconceivable that we shall at any time in the foreseeable future want to use gold for the purpose of buying imports. Our exports will secure all the foreign exchange we shall ever need for the purchase of products abroad.

This is just more of the same. Everywhere you look at our economy, we are impressed with the tragic need of the engineering—the realistic approach. Would any Professional Engineer in charge of the management of our foreign trade, ever put his approval on deals with foreign countries, by which we are to exchange our tangible, usuable wealth, for the largely fictitious symbols of a bygone age that, in all likelihood, will never return?

Why Not Put Business Methods Into Public Affairs?

There are a great many ways in which the techniques of the engineering profession are different from those used by the men who conduct the affairs of government. For instance, when a competent professional engineer offers to design a mechanism, or to erect a structure, he is always able

to produce a blue print of just how he proposed to go about the job. The engineer is able to draw up the specifications and to describe the actual modus operandi by which the thing contemplated is to be accomplished.

Not So The Politician

But when a candidate for public office promises, for example, that he will see to it that 60 million jobs are available; or he assures the voters that if elected, he will cut taxes, balance the federal budget, and pay off the national debt, he seldom accompanies his promises with any details.

By no means do we have any grudge against our political friends. But why should they not be asked to answer questions like the following:

When you increase the total working force to 60 million persons, or increase the total national output to 150 billion dollars, just who is going to buy such a volume of output? Where is the money for buying power to come from? And what will such a vast program for expanding production do to the price levels—to business profits?

After all, such questions are quite proper. For jobs, production, distribution, wages and purchasing power, are all *physical entities,* just like the bridge, the skyscraper or the hydro-electric plant for which the Professional Engineer delivers his blue prints—and does it *before he gets the contract!*

We'd like to know if Professional Engineers agree that public affairs should and could be conducted on the same "show me" basis as that of private business enterprise.

A "Long-Haired Professor" Is Kicked Upstairs

We know a former college professor, a one time teacher of engineering and of research techniques. For some time he was at the head of an important government war time agency in Washington. Some of the rulings of his agency were extremely unpopular with certain elements of business and the general public. Therefore this engineer was widely criticized as a "long-haired professor," an "impractical visionary," a "theoretical intellectual," whose methods were "undermining the foundations of our democratic system."

Pressure on Congress eventually became so strong that action was taken which resulted in the ex-professor being relieved of his job, a position which paid $12,000 a year. Strangely enough, within a month after the termination of his service with the government, private business enterprise engaged this same "impractical theorist," at an annual salary of $75,000.

Anybody's Guess

It is not quite clear from this incident whether business enterprise is going "intellectual," or whether there are actually substantial and very potent elements in our society which will not tolerate a really able and independent man in any policy making position with the government.

Fortunately there is evidence that the old-time fear of clear-headed, thinking, independent government officials is gradually diminishing. After all, we shall never have a government service we can be proud of, so long as we insist on "getting the job" of any man who "can't be handled."

It's true, as Grover Cleveland put it, "a government position is a public trust."

Legislative Committee

(*Continued from Page* 8)

granted a certificate as an engineer-in-training without examination.

Illinois—New Law:

No provision for Engineer-in-Training.

Thumbnail Congressional Sketches

Barkley, Alben W.

Senator from Kentucky.

Addresses: Paducah, Ky., and 3102 Cleveland Ave., N.W., Washington, D. C.

Democrat; U. S. Senate 1927, 1933, 1939, 1945; Representative in 63rd to 69th Congresses.

Lawyer; Marvin College, 1897 (A.B.), Emory College, and University of Virginia.

Committees: Library (Chairman); Banking and Currency; Expenditures in the Executive Departments; Finance, Foreign Relations; and, Inter-State Commerce.

Spence, Brent

Representative, Fifth District of Kentucky; counties of Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Oldham, Pendleham and Trimble.

Addresses: Huntsville, Ala., and The Broadmoor, Washington, D. C.

Democrat; elected to 72nd Congress, reelected to 73rd to 79th Congresses.

Lawyer.

Committees: Banking and Currency (Chairman).

Mansfield, Joseph J.

Representative, Ninth District of Texas; counties of Austin, Brazoria, Calhoun, Chambers, Colorado, Fayette, Fort Bend, Galveston, Goliad, Jackson, Lavaca, Matagorda, Victoria, Waller and Wharton.

Addresses: Columbus, Texas, and Wakefield Hall, Washington, D. C.

Democrat; elected to 65th Congress, reelected to 66th to 79th Congresses.

Committees: Rivers and Harbors (Chairman); Expenditures in the Executive Departments; and Merchant Marine and Fisheries.

McCarran, Patrick A.

Senator from Nevada.

Addresses: Reno, Nevada, and 4711 Blagden Ave., N.W., Washington, D. C.

Democrat; U. S. Senate 1933, 1939, 1945.

Lawyer; University of Nevada (M.A.)

Committees: Judiciary (Chairman); Appropriations; Commerce, District of Columbia; Irrigation and Reclamation; and Public Lands and Surveys.

We know a man who thinks that electing an engineer to a high government post would be a great mistake, for, he insists, "engineers seldom make good politicians." We'd say "thank God for that," but in that case isn't it just possible we could get along much better with less politics and a great deal more analytical ability of the type possessed by good engineers generally? That change might turn out to be a big part of the problem of finding a solution to our social ills. Analytical ability is much like an understanding of mathematics, it can be applied helpfully in a great variety of different situations.

An editorial writer states that certain business organizations are putting pressure on government to see that all construction equipment taken abroad by the armed forces, be left there and not brought back. One of our cynical friends comments, "Why not bring it all back, so we will have it to sell to our future enemies in the next war? Otherwise how can they arm against us? Think of the business we could do!"

National Issues — Washington Economic and Political Front

This is the third in our monthly discussions of the controversies which are agitating Washington, the final decisions on which may affect the overall prosperity of this country, if not the world, for decades. While our reporting must be brief with reference to each of the issues covered, we shall continue to bring our readers what we consider the most significant views on both sides of the major questions of the day.

Men whose opinions carry weight throughout the country, like Mr. B. Baruch, are emphasizing in public utterances, the importance of increasing our total volume of production, if we are to beat back disastrous inflationary forces. Nobody disagrees with this fundamental thesis. Scarcity of any commodity forces prices higher. Plenty of supply in relation to the active demand, pulls prices down. In this connection, however, some disagreeable persons ask, "what would happen to prices, and incidentally to profits and general prosperity, if production should be maintained, at full capacity in the future?" They mean to imply that we are expecting too much of business enterprise to go all out on the production front, a course which might affect prices and profits disastrously. This is a labor point of view.

Automobile Prices

There is much ado about the pressure put on Congress to allow higher prices for new automobiles. Congressmen jammed the conferences on auto prices, obviously alerted by manufacturers. The automobile workers' union issues a statement saying that in five years the labor cost in producing cars has gone up only $34. During the same period, they say, wholesale prices per car has gone up $135 on the average.

At this writing the Office of Price Administration appears to be under heavy pressure. Labor organizations are working for a hold-the-price policy. Business interests are less vocal with facts and figures, evidently depending chiefly on lobby pressure on Congress.

Reconversion director Snyder reported to the President, the finding of government economists supporting the contention that industry generally can raise basic wage rates at least 24 per cent without increasing prices.

Labor leaders say strikes have not materially slowed down automobile production, claiming the automobile industry is not yet ready to get into full scale production.

Sharing Atomic Secrets

There are wide differences of opinion as to the wisdom of Mr. Truman's decision to postpone the sharing of atomic bomb information with foreign nations. Everybody admits the decision is a direct slap at Russia. Such a move is strongly defended on the ground that Russia has kept from her allies a great many secrets connected with her war effort.

The story is current in Washington that when Mr. Attlee, the British Prime Minister, left Washington, he was bitterly disappointed at what he considered to be the failure of his talks with the President on the subject of sharing the atomic secrets. He is said to deplore the "power politics" of the Administration. As a result of the unfavorable reaction in England to this outcome of the talks, the noted English scientist, John Huxley, is expected to visit Washington early in December.

China A Danger Point

Responsible government officials are privately very much concerned over recent developments in China. Defenders of the government's part insist that we were merely carrying out the terms of the Pottsdam agreement, when our marines transported Chinese Nationalist troops into Manchuria. Denial is made of any attempt on the part of our American forces to take sides in the battle with the Chinese communists.

From what news leaks out, it is evident that at the moment, China is the big danger point. Critics of American army policy, point to what they insist is the war department's policy of hoarding surpluses, and delaying the return of troops, especially from the Pacific zones. In such quarters there is fear that we may be edging into World War No. III.

Statement May Boomerang

President Truman's radio address in which he announced that this government would recognize no government imposed on peoples by forces outside, has stirred much adverse comment. Critics insist the statement by the President was meant as a warning to Russia, not to force its regime on unwilling Balkan countries. Actually, the President's rule, if taken to mean what it seems to say, would directly affect our recognition of the English rule in several quarters of the globe, not to mention the Dutch in Java.

Washingtonians are very fond of the "wise crack," even when it strikes close home. Perhaps the smartest of such quips since V-J Day is that of the radio commentator who told his listeners that President Truman was insisting that democracy be given a trial in the Balkan countries on Russia's western borders, and, "if the thing works there, he may suggest we try it in certain parts of this country."

More About Prices

Speaking of the prevalence of strikes in industry, as nearly everybody is doing these days, the C.I.O., Department of Research and Education presents figures of days lost for August, 1945. Days lost because of strikes and lockouts for the month, they say, totalled 1,350,000 for the entire country. For the same period 40,000,000 days were lost because of *unemployment.* If we get the implication, it is that management is responsible for the size of the unemployed list, due to its reported opposition to national planning and to the "full employment" bills before Congress.

From the same labor source we clip these figures: "Corporation profits *after taxes,* increased 147 per cent from 1939 to 1944. Farm prices increased 105 per cent. Workers' hourly earnings increased 61 per cent. Average net farm income per farm was $863 in 1939; $2,478 in 1943—an increase of 185 per cent. Average annual full-time earnings of wage earners were $1,255 in 1939; $2,026 in 1943, an increase of about 60 per cent.

Savings Volume Over-estimated

Some of the current warnings about

the danger of inflation are based on the questionable theory, first, that what we call the low income groups have large accumulated savings from the war years, and second that at the first opportunity, these people are going to rush into the market to buy anything and everything in sight.

There have been some carefully made surveys which indicate that not more than one-third of the American people have extra savings to spend on consumers goods. There is serious doubt as to whether, in view of the widespread fear of impending unemployment, the average wage earner is going to squander his savings in buying things he can get along without. Certainly it is bad for the future of our economy if the people generally, spend their accumulated savings for living expenses.

In fact there is a well informed group of economists in Washington who think the chances of a runaway inflation are not as serious as has been thought, provided reasonably tight price controls are maintained for a few months longer. It is obvious that nobody knows the answer, but probably the really well-informed who are without business axes to grind, are in favor of continuing price controls indefinitely, or until building and production get a good start.

Tax Reductions Opposed

Mr. Bernie Baruch is worried about inflation, and because he is, he has been against any substantial tax reductions. He takes this view, as he is quoted in news reports, on the ground, first that the government needs all the tax money it can get, and second, tax reductions are an unhealthy thing for our economy at this time.

And right in the midst of the talk about the importance of "more production," comes a story that the Department of Agriculture is considering a suggestion to pay a special bounty to farmers to *curtail the production* of eggs, beginning about the first of the year. It seems that if the hens keep on laying as is anticipated, there may be a surplus of 25 million cases in 1946.

"Human Nature" the Goat?

Apparently nobody wants to see prices go down, at least for his own commodity or service. With reference to the things we have to sell, however, most of us would like to see prices go substantially higher. Yet, almost without exception, everybody fears for the future of our economy, if prices generally, and especially the prices for the thing he has to buy, should really go zooming upwards.

Economists refuse to comment in answer to the question whether this phenomenon is due to a fault of human nature or to a weakness in our little understood economic system. No matter how you look at it, it doesn't make sense. But we note that the people who condemn government agencies for "plowing under cotton and killing little pigs," are quick to get their Congressman on the telephone, when any government agency pursues a policy which might put a surplus on the market in which they are individually interested in maintaining prices.

A Scientist Lets Us Down

We were just about to suggest that this whole problem of "scarcity in a land of plenty, should be turned over the scientists and engineers for a solution, when along comes Dr. Lawrence Hafstad, physicist with the Carnegie Institution of Washington with the statement to the effect that technologists have no business talking about ecenomic and political questions.

This comment was an implied reference to recent statements by several scientists urging specific government action with reference to the control of atomic energy. This learned gentleman puts it this way: "Scientists (and no doubt he would include engineers also) are just as naive about political (and economic) questions as many of those interested in world affairs are about scientific questions."

We Stand Pat

Nevertheless we are sticking to our conviction that governmental problems, economic problems, and political problems never will be solved satisfactorily, until men possessing the technological point of view, come to study these problems and are permitted to apply "the engineering approach" to them. We seem to recall a line from our science text book in which the statement appears that: *"Science exempts no problem from investigation."*

If that be political heresy, so much the worse for heresy.

Our Foreign Policy

Our lack of any adequate foreign policy, or effective leadership in foreign affairs, has brought on a near-chaos on at least a half dozen major diplomatic fronts. The absence of unity among the several policy-making government agencies, has resulted in unilateral acts in relation to foreign affairs, which may have dangerous results later on. The effects are already beginning to show in Germany, Japan and in China. Every informed source appears to agree with the foregoing overall analysis.

Military Training

The proposal to require that a year's military training be given to the youth of the country is receiving substantial support by many elements making up official Washington, including, of course, the top figures in the armed forces. Opposition is widespread but scattered. It includes many religious organizations and educational institutions. The Army's newly appointed Chief of Staff, Dwight D. Eisenhower told the American Legion that a year's military training is needed if the United States is to prevent a sudden, overwhelming attack by the "Hitler of the future." Opponents suggest that the only future "Hitlers" will be those that are *built up*, as they say "Adolph" was, by substantial elements in democratic countries. Against that sort of thing, it is suggested, a reasonable amount of internal and external control of domestic pro-fascists could be very effective. Sentiment on this subject is sharply divided in Congress also.

Red Tape

We often hear complaints about the existence of so much "red tape" which interferes with the speedy and efficient functioning of government agencies. Recently members of a group of high placed federal officials were asking each other to give an explanation of the "why" for this situation. Concensus is that while much of this sort of thing is inherent in the usual lack of any real organizational set-up, most of the trouble is due, in every instance, actually to the lack of administrative ability on the part of the top agency head.

Men on the inside of government

(*Concluded on Page* 15)

Science and Society

AN EDITORIAL

The highly trained technologist and the scientist, including the Professional Engineer, occupy an anomalous position in our modern American, our highly industrialized economic environment.

This is inevitable, under present circumstances, because of the highly specialized training which has disciplined the mind of the technologist, as a necessary requirement of the type of work which he undertakes.

How Engineers Work

When the Engineer is at work at his profession—when he is engaged in the highly complex and exacting task of designing and constructing, for example, a skyscraper, a dynamo or any other involved technological project, he must be able to eliminate completely from consideration, all extraneous elements of every nature. He cannot afford for a single moment to allow his own wishes, his feelings, his preferences, or the personal financial interest of himself or of anyone else to enter into his methods of determining the stresses, or the strains that have to be accounted for in the shaping up of his plans.

It is impossible for the technologist to achieve real competence unless he has been able to accomplish this complete personal detachment from all but the essential facts and figures involved in making his creation a sound, safe, efficient and altogether workable instrument to perform the functions for which it is designed.

Lives In Two Worlds

This type of training and experience, this approach to every task, and this point of view—all so inseparably associated with his vocation—forces the Engineer to live actually in two very different worlds at one and the same time. He lives, first in the technological world of exact and a highly specialized science, and also he is in daily contact with a world that is largely a wishful-thinking, highly personalized, and largely irresponsible world.

While on his job, the engineer lives in a world wholly factual and exact. While at other times he is surrounded by those who are largely motivated by selfish interest; individuals functioning, to a great extent, in terms of vague generalities, emotional cliches, incoherent double-talk, and in general, playing to the galleries at all times, certainly with little thought of meeting or solving essential problems involving any great measure of public welfare.

Escape Mechanisms Develop

Unfortunately, many men of good scientific training allow themselves to develop a method of adjustment, or at least compensation, to this situation. They come to think and act as engineers or scientists only when dealing with matters connected with their vocation. When in the laboratory or on the job, they maintain the Scientific Method and outlook. At most other times—in their clubs, in their business dealings, in the voting booth and in their discussions of public questions generally, both economic and political—some engineers have a tendency to shed their technological attitude and analytical point of view. They then become just another "ditto copy" of the current and colloquial Mr. John Q. Public.

Thus when the technologist steps out of his scientific atmosphere, he is able to indulge in the current emotional cliches; he is awed by the same high-sounding shibboleths; is subject to the same set of prejudices; is enthused over the same inanities about questions of public policy, when he sees these vital human issues generally being kicked around in the usual grossly distorted and utterly unfactual conversation which we all meet with everywhere.

America In Dangerous Spot

If we really understand what it means for our best trained minds to cater thus to the "tyranny of the common denominator," we will see that it is a serious situation. For American economic and similar matters are in dire need of the best type of thinking and critical analysis that Professional Engineers are capable of giving them.

The best thinkers in America agree that if this country is to continue as the land of the free, some way must be found by which our democracy can be made to function properly.

One of the world's best known scientists made a comment recently, whether facetiously or not we do not know, to the effect that, "to make democracy work for the good of the people, the *average of human intelligence would have to be above the average.*" But whether this was a "boner" or just a joke, unhappily there is much more real truth to the statement than we could wish. Our democracy must command the services of many more of the highly trained type men of intelligence, and must immediately apply their best thinking to the solution of some of our most pressing human problems. If the active cooperation of such superior minds is not made available, nobody knows what the tragic consequences may be for all of us.

Stalin Says A Mouthful

During Mr. Eric Johnston's recent visit to Russia, he took occasion to assure Marshall Stalin that, "We Americans have no objection to the form of internal economy which you have set up in Russia. But we feel the Russian people should clearly understand that we want none of your communism in America."

To this Mr. Stalin replied in substance as follows: "Very good, Mr. Johnston, but the American people would be wise also to remember that we Russians do not have communism here, just because many of us may have 'wanted' it. We got communism in the first place, because the former system of social organization in Russia broke down completely. May I suggest for your consideration, that if the leaders of the American people do not find a way to make their present system of social organization function for the benefit of the people of your country, then you are bound to experience drastic changes, and the nature of those changes is not likely to be what anybody in America wanted."

It's An Engineering Problem

All of this is especially pertinent and important for all technologists to consider. There are a number of rather obvious reasons why this is true. Among the reasons are, First, that the engineering profession is largely the creator of the recent very rapidly expanding technological developments, used so generally in the

production and distribution of American goods and services.

Second among the reasons is, that technological development has brought on an unprecedented era of specialization. Many Engineers feel that this might cause us serious difficulties. Third, we have not learned how to prevent serious technological unemployment; we have not been able to find a satisfactory method of passing along to consumers and workers, the savings resulting from the use of technology; and fourth, but by no means the final reason, we have not been able to learn the secret of increasing our total production levels in America, without, at the same time vastly increasing the overall total volume of our public or private debt.

Engineers Should Understand This

Contrary to much popular thinking, these human affairs problems in Americas—those that create depressions and unemployment—are not basically political, or even economic, so much as they are simply technological problems—problems involving chiefly the efficient physical production and distribution of goods and services in balanced load ratio.

The issues that endanger America's future at present, are technological—they are engineering problems—in the sense that they stem from our rapidly increasing use of technology. Also because we have not yet adjusted many of our social customs to our growing use of technology.

These problems are, or should be of the deepest concern to every Professional Engineer, first because of the nature of the problem, and, even more significantly, because no other group in America has the type of mental training and experience which is absolutely essential to enable them to successfully initiate and to carry out the necessarily complex and possibly, in some ways, revolutionary type of program. Let no man take fright at that, for every intelligent man knows that, after what this world has been through, changes must be made. We must make the necessary adjustments to arrest the present trends in the direction of complete collapse. It is the only way to save America from the immediate threat of tragic catastrophe. It is the wise thing to do, to put the needed changes in the hands of the type of men who really designed and built the industrial America of which we so proudly boast.

It Won't Be Easy

What do we mean by "changes?" We mean changing from the kind of government administration that has made the word "politics" a by-word from Maine to California. We mean to take out of the hands of notoriously incompetent men, the highly technical decisions that only trained minds can be trusted with safely. We mean putting the responsibility for social administration in the hands of the same type of men, whom our greatest industrialists trust to design and to operate for them their giant industries and communication systems.

The idea is "revolutionary," but it is by no means "radical." Business does it every day. Why shouldn't government?

The greatest stumbling block may be the present "introvert" attitude of many technologists and scientists themselves. Trained in mind as they are, some engineers will not find it easy to assume responsibilities of an *administrative character.* There are many engineers, of course, who, because of their personal characteristics, should never be urged to take on executive jobs.

Some engineers will shrink from governmental responsibilities because they insist that they do not understand politics, or would not make good politicians. We say, that's the kind of Engineers the government needs in positions of public trust and responsibilities. An engineer as a member of Congress, for example, and who could so far misunderstand the reason for his being there as to attempt to become a typical politician, had better be kept at home.

All Engineering Based On Change

In the practice of his profession, the engineer is always proud to be doing bigger and better things. In spite of that, however, many of them, in dealing with issues outside of their technical field, tend to become victims of the *fear of change* in any social situation. But that fear is rapidly being dislodged in America, by the

A CONTRAST IN MENTAL ATTITUDES

The Scientific Mind	*The Popular Mind*
1. Objective. Impersonal. Desire subordinated to intellect and reason.	1. Subjective; personal; Intellect and reason subordinated to desire.
2. Observant. Sensitive. Curiosity impersonal and disciplined. Attention alert and pointed.	2. Unobservant. Insensitive. Curiosity personal or lacking. Attion diffuse and uncertain.
3. Significantly informed.	3. Insignificantly informed or ignorant.
4. Objectively skeptical, (factual skepticism).	4. Credulous, or subjectively skeptical.
5. Critical (a) Of premises, (b) of logical processes.	5. Uncritical, or critical only of logical processes.
6. Tolerant.	6. Intolerant.
7. Intellectually patient. (Can suspend judgment).	7. Intellectually impatient. (Jumps at conclusions).
8. Constructively imaginative.	8. Fanciful, or unimaginative.
9. Fearless in facing facts.	9. Fearful of disagreeable facts.
10. Courageous in defending its scientific convictions.	10. Lacking in the courage of its convictions, unless motivated by special interest, or backed by authority.
11. Unimpressionable by authority or prestige.	11. Reverential to authority, impressed by prestige.
12. Intellectually unconventional.	12. Intellectually conventional.
13. Unegotistic.	13. Egotistic.
14. Deterministic. Behavioristic. Not given to praising and blaming. Faith in law.	14. Literarian. Given to praising and blaming. Faith in whim.

(From "Conservatism, Radicalism and the Scientific Method," by A. B. Wolfe, The McMillan Company)

now inescapable evidence of the infinitely greater danger of letting things drift into utter chaos.

The critical danger which threatens America and the world, is well illustrated by a copyrighted story appearing in one of the weekly pictorial sections of a recent newspaper. According to this story, a farmer climbs a ladder into the haymow of his barn. There he is startled to find his young children playfully spilling high octane gasoline over each other in the midst of highly inflammable hay. The hired man sits smoking a pipe nearby, keenly enjoying the children's sport.

This story is not over-drawn, as representing our nation's present position, with our leaders, possessing no particular training for their present responsibilities, except that of vote-getting, are tossing issues around involving highly explosive situations like that associated with atomic energy, as though one man's opinion on such issues was as good as another's!

"Popular Mindedness"

To be perfectly blunt about it, we in America must have in government a liberal application of Scientific Method and the engineering method of handling technological issues, as one means of off-setting what A. B. Wolfe, in his book, "Conservativism, Radicalism and the Scientific Method," calls "Popular Mindedness."

This popular mindedness represents what is perhaps the exact opposite of the Scientific or Engineering attitude. Popular minds, as Professor Wolfe uses the expression, make up the bulk of American voters. These types of minds elect to public office, at all the various levels, a high proportion of officials who have very little capacity to deal effectively with modern, highly technical problems.

With the author's kind permission, we are presenting herewith his table comparing the attitudes of the two sharply contrasted types of individuals. It matters little what problem is presented to the "popular-minded" individual, he usually reacts in the popular way. He seldom, if ever, reacts otherwise. Unhappily there are men with real scientific training, as we have suggested earlier, who, when they are confronted with a problem which they imagine is "political," or "economic," have a tendency to "follow the leader," and to base their judgments pretty much as does the individual with little or no scientific background.

Our Future At Stake

The whole future of America is dependent on a much wiser handling of her major public problems, than has been her fortune in the past. There are few who could deny the truth of this. We repeat, these major problems are often full of technological elements, which the man without technical training will fumble, nine times out of ten.

Complacency with a "muddle-through-somehow" policy in government, was tolerable in the horse-and-buggy-age. Policies of that kind were inevitable so long as popular minded persons got into positions of responsibility which they never are able to carry adequately.

Postponement May Prove Fatal

Here is an issue of over-towering importance to Engineers, and one which cannot wait too long for the answer. America desperately needs Professional Engineering minds, combined with administrative ability. To those who object, we reply, "Engineers built America—what reason is there to think they cannot do an equally good job of planning and administering America's public affairs also—at least the part that is physical and technical?"

Certainly there are Professional Engineers—plenty of them—who possess both the ability and the clear-headed vision to understand the great importance of the technical service their highly specialized training enables them to render to their country, as servants of all the people.

What Government Needs

Our government service needs—not so much better politicians in public offices—as it needs better executives, better administrators, better brains, and men with a keener sense of social responsibility for the long range consequences of their public policies. The government service needs men who can stand on principles which rise above politics.

It may be that such an aim may serve as a real and much needed dynamic with which to spur Professional Engineers all over America, to get behind the National Society of Professional Engineers. Certainly if the Profession of Engineering in America is to become completely unified, we shall need a forceful organization with specific objectives. Lacking definite and concrete policies and aims, there is little chance of any real victory over the decadent forces of what Grover Cleveland termed "innocuous desuetude."

National Issues

(*Concluded from Page* 12)

agree with the view of the late Elbert Hubbard who always insisted, "Every organization is but the lengthened shadow of *one man,* the man at the top." That this is true in the federal government is demonstrated by the fact that *there are a few heads who know how to cut red tape* and to get things done. Their number is extremely limited. Minor employes can't do much about red tape, when their chief just hasn't got what it takes in the way of basic inteligence—when the top man does not possess what one Professional Engineer calls "integrity of the cells." Seldom is there any substitute for intelligence.

The three-cornered conflict in the Labor Conference between the A. F. of L., the United Mine Workers, and the C. I. O., hinges pretty much on the organizational form each represents. Mr. Murray, representing a vertical form of organization, wants to raise wages all along the line. He is opposed by John L. Lewis and William Green, who have to cater to a more horizontal type of union set up. These two are against a blanket wage increase, but struggle vigorously against putting themselves on record directly. Our guess (which may prove mistaken) is that the vertical alignment has a strategic advantage which makes it likely to win.

The future of engineers, of America and of the world, depends upon what we do about scientific research in the social sciences in the post war world. We know something about radar, penicillin, blood plasma and a few of the simpler things. But some of the most important and thrilling new discoveries are still deep government secrets. There are those in high places, you know, who are afraid that this backward world of ours might progress *too* fast.

A bright pupil was asked, "What is the difference between science and religion?" He replied: "Science is material, while religion is immaterial."

Combination of Specialized Business Skills, Plus Overall Engineering Approach, America's Crying Need

Successful men are generally those who specialize. They are men who have concentrated their energies in a relatively narrow field. They have been able to master the "know-how" of their business better than many of their competitors. Therefore they have become recognized as leaders in the field in which they specialize.

But there are certain extremely important fields of activity in which the specialist may lack the breadth of information and understanding which the job requires. Government service, at the policy making level, is one place where the successful specialist often falls down. There are government agencies which are heavily staffed with men of real ability—as experts, as specialists—but in which little administrative vision or ability to "*organize, deputize and supervise,*" is to be found.

Confession of a Specialist

Touching on this subject, the late General Hugh Johnson, in one of his radio broadcasts, told of an interesting conversation with one of America's leading steel executives. This man knew the steel business, from the mining of the crude ore, clear through to the final finishing processes. He knew how to market steel. He knew what steel buyers' requirements were. On the subject of the steel business this man was an *expert.*

"There isn't a thing I don't know about steel," Gen Johnson quoted this man as saying, "but, when it comes to any of these social, economic or political problems, I'm a very ordinary guy. If you ask me how the government can balance its budget; how to adjust the country's total volume of production, prices, etc., so there will be a continuous market for what our mills, factories and service industries produce—on such broad, overall questions, my judgment is not a whit better than that of the average man in the street."

Vagaries of Voters

What the steel man said of himself is not what most Americans believe about highly successful men. American voters incline to the view that the man who has amassed a fortune, one who has "met a payroll," ought to be a good man to head a government agency.

The experiences of this government in its early attempts to find men who could gauge this country's war needs, illustrate the truth of what this steel man had to say of his own limitations. The complexities of overall *social economics* are infinitely greater than those of any single business enterprise whose financial success depends primarily in its ability to sell a big volume of output at prices substantially higher than its cost. One job requires a broad view of social policies from the standpoint of the entire country, while the success in the other can be accomplished by efficiently building a compact inner-cooperating organization, concerned chiefly with its own interests.

Government Needs Administrators

And yet government does need the type of organizing and executive brains that is seldom developed except in the handling of vast business operations. It may become necessary in the very near future, for some of our key industrialists to *pool* their varied individual and highly specialized managerial skills, for the purpose of developing and applying sound administrative principles to the solution of many of our major social problems.

Unless something of this kind is done, America is in danger, as well-known economists have pointed out, of becoming rich in mere book values —in the paper evidences of wealth— and actually bankrupt in the essentials of a living for the people.

Alternatives Risky

If American business genius should fail to attempt the solution of America's overall problems, there is every likelihood that *government brains* will be forced to do something drastic—something that may not be too well considered, in part because not all interests will be duly represented.

To our view, the Professional Engineer fits perfectly into this picture.

Certainly there must be taken into consideration the culture that is, in the best sense, most typically and most exclusively American—our high-powered industry—the technology which only the Professional Engineer can design and keep in first-class operating efficiency. No overall plan for the betterment and stabilization of prosperity in America can succeed permanently, which is not based on those technological industrial operating conditions that are so endemic to this country.

A "Power-House" Situation

In short, due to the very nature of our situation, the social economics of this *power-house* that produces and distributes our vast wealth output, must be based on an application of Scientific Method. The design must be built almost wholly on the "engineering approach." It's a job largely for the Professional Engineer.

There are indications that atomic power will not tolerate the traditional "muddle through somehow" policy. Professional Engineers understand the dangers inherent in wishful thinking, in guessing—even if done by the representatives of a majority.

Our problem is of a nature that it must be solved without delay.

Failure as a rule results from delay in recognizing and reinforcing our limited competence.

"Never in the whole history of the human race did so many people need to know so much."—motto of a radio chain. It might help to teach the fundamental of the Scientific Method in our schools.

General McArthur, at the signing of Japanese peace terms: "We pray that peace may now be restored to the whole world, and that God may preserve it." We hope there is nothing irreverent in suggesting that God may expect our leaders to use their heads also.

It is said that at least four of the great nations of the world now have populations from two to four times as great as the resources they possess can possibly support in even moderate comfort. Has anyone a long term plan to solve this problem?

Coming State Society Events

This department in the American Engineer is starting small, with the knowledge it will grow as chairmen of program committees become aware that we want dates, places and other details of *State meetings, as far in advance* as possible. We cannot include city or County Chapter events in this column, for the reason that they usually have only a state-wide interest at most.

The future events we have been able to glean from news letters and other material received, which are far enough in the future for mention here, are the following:

Jan. 11th, Georgia Engineering Society, Atlanta.
Jan. 25-26, Illinois Engineer Society, Annual Meeting, Rockford.
Jan. 28th, District of Columbia Meeting, Washington.
Feb. 20th, Minnesota State Council Meeting, St. Paul.
Feb. 21st, Minnesota Annual Assembly Meeting, St. Paul.
Mar. 15-16, New Jersey State Annual Convention, Newark.

To Program Chairmen

Your Editor would like to present more real and up-to-the-minute State and National news of general interest, than has ever appeared in The American Engineer. There are several ways you can make it possible for us to do this. Among them are:

(1) Don't let us wait for important announcements of meetings or items of general interest, until we receive your regular printed bulletin. We suggest that when you are preparing your copy for your printer, you make a carbon, and send that to our Washington office at once. In this way we can give real publicity to many items that otherwise would reach us too late for publication in The American Engineer. We can best use the news while it is still news. This is especially worth remembering with reference to news of meetings of your State Society, or any meeting at which any National officer is a speaker or guest. Future issues of the Magazine are to be mailed earlier in the month (we hope) so keep this in mind please.

(2) We want for publication two (2) copies of any State Registration Act which is available, provided it has not been printed in The American Engineer. News about any Schedules of Minimum Fees, with copy of the schedules, are always of interest.

(3) When your State President, Secretary, or Director makes a talk at a State or Chapter meeting, send us the details, and if possible, at least a summary of his main points. We would like to receive a copy of addresses made by prominent engineers on any non-technical subject of general interest to our readers. We want to get notices of the event anyway.

Give The Editor A Hand

(4) We repeat our request that we are always interested in receiving letters of comment on any matter relating to the objectives of the National Society of Professional Engineers. Especially valuable are constructive discussions on such subjects as: Minimum fees; the importance of engineers registering; the objectives or policies of the National Society, and how they may be more effectively promoted; why engineers are not duly recognized and accredited; engineers-in-training; education for engineers; why engineers must become more vocal (individually and through the NSPE); are more engineers in policy-making positions in government socially desirable?; should the NSPE as one of its policies promote the ideals of "more Scientific Method in government?"; should engineers take more interest in political and economic subjects?; how can Chapters increase their membership more rapidly; and, what features would you like to see deleted, added or improved in The American Engineer? And, of course, any other topic on your mind.

This May Mean You

(5) There are many exceptionally able members of our State Societies who have ideas about the status of Professional Engineers, and about ways and means of promoting the growth and influence of the NSPE. We wonder if it is not correct to say that such men have a personal obligation to less richly endowed men of their own profession. The obligation to share some of the best thoughts and points of view with the other fellow.

Really brilliant intellects seem, sometimes to take the attitude once assumed by a former Congressman from Illinois, the late Joseph G. Cannon, when he made the obviously facetious observation: "Posterity never did anything for us; why should we do anything for posterity?" We have wondered if the reticence of the really brainy chaps isn't due, sometimes, to a feeling that "the little guys wouldn't be interested, so what's the use."

We doubt, however, if the really top flight key men in the engineering profession feel that way. Maybe the reason some of them who read The American Engineer, haven't contributed recently of their wide understanding and broad vision, through a "lead" article in this Magazine, is because they weren't certain it would be *really appreciated* as it should be.

Well, here's your invitation Gentlemen! We'd make this a personal, Air Mail letter, if we knew the name and address.

Will you drop us a line—right away—just to let us know you're working on the idea—for the upbuilding of the Professional Engineer, and for American "posterity."

We extend our thanks—in advance, and will make it personal on hearing from you direct.

There are two extreme ways of viewing the world and its problems, which are responsible for a great many controversies. One is taking a bird's eye view, and the other is taking a worm's eye view. Neither point of view is accurate.

The scientific point of view maintains that all opinions are held under protest, because no better ones have come to hand. As the science of *measurement* develops, there is less and less need for men to act on the basis of anyone's *opinion*.

We know that only that which is measurable can be called truly scientific. True science centers chiefly on those things on which there is a large measure of competent agreement.

A mistaken observation trips men up more often and is, in the long run, more serious an error, than when they hold a mistaken theory, for the latter will more easily give way, in time, to a better theory.

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Kindly report any errors or omissions to the Editor.

National and State Society News

DISTRICT OF COLUMBIA

In place of the regular monthly meeting of the District Society, members participated in a joint meeting with the American Institute of Electrical Engineers, Tuesday evening, November 20th. The speaker was Dr. Charles F. Kettering, president of the General Motors Research Corporation, whose subject was, "The General Motors' Technical Center and its Program." Dr. Kettering's address dealt with many of the interesting features of the vast research program of the General Motors Corporation. Due to conflict with the Christmas Holidays, no meeting is scheduled for December. The next meeting of the District of Columbia Society will be on Monday, January 28th, at the Potomac Electric Power Company Auditorium. The local Legislative Committee expects to receive at that time, a complete report from the District Council of Engineering Societies covering the stand that each member engineering Society of that organization has taken on the Registration Bill.

A large number of Professional Engineers from the District of Columbia Chapter participated, on November 15th, in a reception and dinner in honor of Brigadier General Charles W. Kutz, the retiring Engineer Commissioner for the District, and Brigadier General Gordon R. Young, the newly appointed Engineer Commissioner. Frederick W. L. Hill, President of the District of Columbia Society of Professional Engineers was a member of the Executive Committee which arranged the reception, which was one of the largest gatherings of highly placed engineers and other notables of the District in many a day. Upwards of one thousand were seated at dinner, many of them nationally known figures.

ILLINOIS

The tentative program for the sixty-first annual meeting of Illinois Society of Engineers was approved by the Board of Trustees, at its meeting on November 3rd. The full program will be published in the December issue of the "Illinois Engineer." The Annual Meeting is to be held January 25-26, at Rockford, Illinois.

President C. J. McLean, of the Illinois Society has addressed a number of Chapters on the subject of the relation of the Illinois Society of Engineers to Professional Engineering in the State.

It is a matter of note that while everybody is aware and often amazed at the accomplishments of engineers in connection with the prosecution of the war, engineers still find themselves and their profession, generally represented only as individuals, or through specialized technical groups.

Our members in Illinois feel that our membership of only 1,000 engineers, after sixty years of effort, must have missed some points. Realizing this, increased attention is being paid to matters of professional interest, such as promotion of registration legislation. Our success in this direction has been obtained finally working in cooperation with the Illinois Engineering Council, and by joining with the National Society of Professional Engineers, which has done most to recognize the civic responsibilities of engineers. Codes of ethics, standards of fees and salaries have been set up. It is estimated there are 22,000 engineers in Illinois, and we should get them all in our organization. The four questions of policy, submitted to the membership last spring, have all been approved and will be reflected in their new constitution soon to be submitted for the guidance of all future activities.

MINNESOTA

GREETINGS—The Fall season has started off with a bang. MAPE now has 529 members. Only 6 persons are delinquent on this year's dues.

Mr. Al. Kircher of Mankato, Vice-President of MAPE and President of the League of Minnesota Municipalities, attended the annual convention of the American Municipal Association in Chicago on November 15-17. In attendance also was Richard R. Price, Honorary President of the League and Executive Secretary of MAPE.

The steadily growing movement for unification of the engineering profession demands the enthusiastic support and co-operation of all professional engineers. The necessity of an overall organization such as MAPE and NSPE is the matter of dues. Our Naent. The professional spirit and the professional attitude of an increasing number of engineers are a *source of* gratification and pride.

The great question now before NSPE is the matter of dues. Our National Director reports that the National Society cannot do the work it is expected to do on a budget of $28,000 a year. At the last meeting of the Board it was voted to increase its national dues to $10.00 a year, effective January 1, 1947. It is clear that no such action can be effective without the concurrence of the State Societies. The district societies should consider this matter carefully and then instruct their respective councilors accordingly. This is a matter of the gravest importance.

Director S. L. Stolte has been delivering a number of very effective talks before district meetings. From the number of applications resulting, it is evident that he is convincing Professional Engineers they ought to join the Society.

NOTES—Cities and villages have been notified that the law does not require them to advertise for bids for engineering service.

Applications for registration are coming in to the State Board in unprecedented numbers. Much of this is probably due to the improvements in the Registration Law. There is a great opportunity for building up MAPE membership.

The next annual convention of the

State Federation of Engineering Societies is fixed for February 21, 22, 23, 1946. February 21 will be the day for the Annual Assembly and meeting of delegates of MAPE. The State Council will meet on the evening of the 20th.

A committee of District 5 is working on a standard form of a contract between municipalities and engineers for engineering services.

Uncle Sam Steps In

Attention is called to the fact that the Federal Works Agency has recently announced that plans for architectural and engineering projects for the construction of which federal funds are to be requested must be prepared by architects or engineers qualified and registered to practice in the state in which the project is located.—From Minnesota SPE News Letter.

NEW JERSEY

The 7th Annual Land Surveyors Conference in New Jersey was held on October 27, 1945 in New Brunswick, and was attended by over 100 Land Surveyors. This conference is sponsored annually by the New Jersey Society and this year provided an exceptionally interesting program for Land Surveyors and Engineers attending. The following subjects were featured.

"Riparian Surveys".

"The U. S. Coast and Geodetic Survey and Its Relationship to the Professional Engineer."

"Aerial Surveys as Developed during World War II".

"The Transit—Its Cleaning and Lubrication".

A few years ago under a WPA appropriation approximately two million dollars was spent in New Jersey to establish the New Jersey Plane Coordinate System. When WPA was terminated, the project was incomplete and now control monuments and other net work are falling into disrepair and need replacement. Accordingly the New Jersey Department of Conservation, in its budget proposal for the next fiscal year, is requesting an appropriation to maintain and extend this system.

The New Jersey Society has energetically endorsed the approval of this budget item by contacting Governor Edge and other necessary State officials. A recent reply from Governor Edge indicates that favorable action will result.

The twenty-second annual convention of the New Jersey Society of Professional Engineers has been changed to March 15 and 16, at Newark, N. J. The State Society will be the guests of the Newark Chapter of Professional Engineers on that occasion.

This will be the first large scale convention of the Professional Engineers which has been held in New Jersey in the past five years. An elaborate educational, social and entertainment series of programs are being arranged for the event. There will be manufacturers' exhibits; individual conferences on the part-time basis of segregation of engineering branches; and discussions of a number of major subjects of interest to all engineers, in the light of the present transition period.

A convention dinner-dance will be one of the highlights. A well rounded program of ladies' activities, including a fashion show is being provided. There will be the usual "smoker," and excellent professional entertainment. State officials promise this as a "History-Shattering" convention — the "greatest conclave of Professional Engineers in the history of New Jersey." The announcement looks good to us.

NEW YORK

The Erie County Chapter of the New York State Society of Professional Engineers were entertained on November 19th by an inspection trip through the Huntley Station of the Buffalo Niagara Electric Corporation, located on River Road, about one and a half miles beyond the Buffalo City line. This new unit at Huntley is one of the outstanding installations in the country.

Among the many items of special interests to engineers was the new 80,000 K.W. unit. The inspection was at 3 p.m. Following, there was dinner at the University Club, and an address by Raymond T. Henry, Chief Electrical Engineer of the Buffalo Corporation. President Gust. Karlsteen gave a report on his impressions of the State meeting in Binghampton, in October.

Registrations in New York

During the year ending June 30, 1945, the New York State Board of Examiners for Professional Engineers considered 1,018 applications of which 42 were rejected, 485 held for final written examinations, 99 assigned to preliminary examinations, 68 held for further consideration, 71 certified as having passed the preliminary examinations, and 253 recommended for licenses (including those who passed the examinations).

At the June 1944 final examinations, 76 passed, out of 141 candidates. At the February 1945 final examinations 68 passed, out of 154 candidates.

At the June 1944 preliminary examinations (for Engineers-in-Training), 38 passed out of 62 candidates. At the February 1945 preliminary examinations, 33 passed out of 52 candidates, bringing the total certified as Engineers-in-Training in New York State up to 142.

W. C. White, electronics engineer with the General Electric Company, gave a demonstration of Micro-Waves as applied to Radar, at the November meeting of the Albany County Chapter of Professional Engineers. His talk was illustrated with graphic slides.

The New York State Society of Professional Engineers is printing in pamphlet form, 3,500 copies of the recently approved Schedule of Fees and Salaries for Engineers in the State. These will be mailed to all members and organizations concerned.

Engineers William H. Larkin (Richmond) and Leland R. Post (Broome Area) were elected to represent New York State as National Directors to the National Society of Professional Engineers for the year 1946.

New York County Chapter reports that an extensive membership drive is being conducted which shows every sign of achieving good results. The Editor of the New York State Society News Letter suggests that such a drive would be a good idea for all Chapters. Albany County Chapter already has taken the hint, and the results are fine.

Ohio State President Urges Engineers to Register

Speaking at a recent meeting of the Cincinnati Chapter of the Ohio Society of Professional Engineers, President John Hale had some highly significant things to say to engineers who may be debating in their own minds whether they ought to become registered.

He pointed out that the registration laws in most states are in a condition of flux. The requirements generally are being stiffened, and standards improved all along the line. He suggested that registering now, may be easier than it will be a little later.

Mr. Hale also referred to exemptions accorded industry in the past and observed that it is only a matter of time when all engineers will have to become registered as a condition of securing desirable employment.

In reference to the acceptance of testimony by the Courts, Mr. Hale said that the tendency now-a-days is to consider as "expert" testimony, only that of registered professional engineers.

Speaking of the urgent need for a stronger National Society, President Hale stated that 60 per cent of the bills before Congress affect engineers and engineering in some respect. He expressed as his opinion that the present membership of the National Society of Professional Engineers is only a fraction of what it should be if professional engineers are going to be able to influence legislation constructively. He made a plea for a goal of 100,000 members.

Ohio and Penna. Engineers Please Note

New legislation requiring written examinations for professional engineering license becomes effective in Ohio on January 1, 1946; in Pennsylvania the new law becomes effective on July 1, 1946. All engineers eligible for such licenses are urged to file their applications before these dates. Please pass this information on at once to your friends who might be interested.

It is easy to know much and really understand very little. There are times when the correct interpretations of the available facts, are even more important than the facts themselves.

PENNSYLVANIA

The November meeting of the Philadelphia Chapter was featured by a Symposium on "High Lights of the New Pennsylvania State Registration Law," led by Ray M. Fuller, State Vice President. William A. Hamphill, chairman of the State Legislative Committee, read a paper prepared by Albert C. Wood. After comments on this, Samuel I. Sacks gave a comprehensive running summary of the provisions of the new State Act.

Attendance and interest in the meetings are increasing. Seventy were present for dinner, and more than a hundred at the November meeting. Past president William Bush presided. After 9:30 there were motion pictures and the usual social hour.

SOUTH CAROLINA

T. Keith Legare, who for 22 years has been executive secretary of the National Council of State Boards of Engineering Examiners on a part-time basis, began giving his entire time to this important work and to the South Carolina state board of engineering examiners, of which he is to remain secretary.

The National Council is the coordinating agency of 50 legally constituted member state boards. All the states, with one exception, and Alaska, Hawaii and Puerto Rico, are members of the National Council. This Council is the national clearing house and information bureau for the legal registration or license of professional engineers. These activities have increased to such an extent as to require a full-time secretary.

Engineering Research

We agree most heartily with the editor of Engineering-News Record in his comments on those United States Senate Bills to aid scientific research, which comment appeared in the November 7th issue of that journal. Pointing out that while the present wording of the bills now being considered, may imply that some of the aid will be used for engineering research, none of them specifically say so. Says the editorial: "Because men like Dr. Bush who were instrumental in having these bills written—and who may have a large say in how the proposed federal aid is used—are men chiefly concerned with pure science, it seems desirable to have the legislation that is finally adopted, state specifically that research into engineering problems is to be included. Expansion of research in the basic sciences is highly desirable, but if that research is to make its greatest contribution to technological progress, ample funds also must be provided for studies directed toward the practical application of the knowledge acquired by that research."

Some economists insist that the great era of growth and expansion in America, ended with the cutting off of immigration and the exhaustion of our supply of "free land." Others deplore such a "defeatist" view and point to the many new products which are available for industry to produce and market. A third type of economist reminds us that for every physical expansion of our industrial plant, there must be a corresponding "expansion" of the (private) debt load. Increased production also requires a heavy and wide increase in the volume of buying power distributed in the form of wages to workers. At this point the discussion usually breaks up. The whole subject requires a good dose of "scientific method," in our humble opinion.

A Chinese philosopher comments significantly on the attitude of some impractical people. He says: "He who waits for a sign from Heaven, while neglecting the earthquake, is devoid of wisdom."

We know people who remind us of the Jersey City politician who excused his official misconduct by saying: "There are times, you know, when a politician has to rise above principle."

The road to peace is conceded generally to be more difficult than the road to war. This may or may not illustrate the old saying, "it is easier to do and die, than it is to reason why." America is fortunate in having technical men, trained in high art of "reasoning why."

A "conservative" has been defined as a man who wants huge business profit as a reward for taking a "risk," and then insists that the government guarantee either his profit or his investment.

Massachusetts State Society Organizes For Membership Drive

The Massachusetts State Society of Professional Engineers held its first meeting on May 23rd, 1945, at the University Club, in Boston, with its newly elected officers presiding, as follows:

President, William F. Ryan, Assistant Engineering Manager, Stone & Webster Engineering Corporation, 49 Federal Street, Boston 7, Massachusetts.

First Vice President, Charles W. Kendall, Chief Engineer, Turner Construction Company, 143 Newbury Street, Boston, Massachusetts.

Second Vice President, George E. Fox, Chief Engineer, The Chapman Valve Manufacturing Company, Indian Orchard, Massachusetts.

Secretary, Alvin S. Mancib, President, Alvin S. Mancib Company, West Somerville, Massachusetts.

Treasurer, L. P. Leathers, Plant Engineer, W. F. Schrafft & Sons Corporation, 529 Main Street, Charlestown, Massachusetts.

Board Member, R. D. Stuffner, Chief Engineer, New England Gas & Electric System, 719 Massachusetts Avenue, Cambridge 39, Massachusetts.

Board Member, Milton F. Beecher, Director of Research, Norton Company, Worcester, Massachusetts.

Mr. Lawrie Addresses Meeting

The meeting was called to order by President Ryan. He spoke on the progress the State Society has made, and introduced the speaker of the evening, who was President Elect Lawrie, of the National Society. Mr. Lawrie spoke on the subject, "What the Society means to the Professional Engineer" and answered questions asked him by the members present. This was a very successful meeting and was attended by some fifty members.

The Board of Directors of the Massachusetts State Society held its first regular meeting on Tuesday, Sept. 25th, at the University Club in Boston. At this meeting the following Committees were appointed:

NOMINATING COMMITTEE: 1, Chester P. Baker, Acting Chairman, Educator; 2, Francis W. Mahoney, Private Consultant; 3, Charles A. Fritz, Public Consultant; 4, Cyril H. Hannon, Industrial Consultant; 5, James A. Powell, Industrial Consultant; Maurice A. Reidy (Alternate), Private Consultant; A. W. Hodges (Alternate), Public Consultant; Charles F. Vaughan (Alternate), Industrial Consultant.

RITCHIE LAWRIE, JR.,
the National Society's newly elected President, who spoke at the first meeting of the Massachusetts State Society.

MEETINGS AND PROGRAMS COMMITTEE: 1, C. A. Kendell, Boston—Acting Chairman; 2, V. T. Malcolm, Indian Orchards; 3, G. A. Rehm, Worcester; 4, L. P. Leathers, Boston; 5, E. L. Blair, Boston; 6, B. V. Giegerich, Pittsfield; 7, O. T. Tungberg, Quincy.

Get Behind This Committee

MEMBERSHIP COMMITTEE: 1, George E. Fox, Springfield, Acting Chairman; 2, Edward E. Lynch, Lynn; 3, Peter J. Equi, Holyoke; 4, John G. Thomas, Lowell; 5, Ernest J. Bleiler, Waltham; 6, C. M. Clark, Boston; 7, N. E. Smith, Fall River; 8, P. W. Terry, Pittsfield; 9, Gorton W. Brush, Boston; 10, H. G. Bower, Boston.

LEGISLATIVE AFFAIRS and PUBLIC HELATIONS COMMITTEE: 1, Milton F. Beecher, Holden, Acting Chairman; 2, F. M. Gunby, Boston; 3, James H. Carr, Boston; 4, John T. Croghan, Cambridge; 5, Jerome A. Johnson, Boston; 6, N. B. Mitchell, Salem; 7, E. W. Olson, Fall River.

ETHICS and PRACTICES COMMITTEE: 1, Ray A. Newton, Wellesley, Acting Chairman; 2, Harold S. Cole, Boston; 3, Lionel A. Gale, Boston; 4, G. F. Holland, Boston; 5, H. Chisholm Boston; 6, H. W. Woodgar, Pittsfield; 7, John W. Thompson, Boston.

EDUCATION COMMITTEE: 1, Chester P. Baker, Boston, Acting Chairman; 2, L. A. Whipple, Boston; 3, A. J. Leavitt, Boston; 4, F. J. Graf, Boston; 5, Maurice Reidy, Boston.

These committees are now holding separate meetings for the purpose of electing permanent chairmen. As soon as this is accomplished, the State Society expects to be well launched on a successful season in which we expect to have some interesting meetings and enrole many new members.

Our first open meeting under this new management will be held January 12, 1946. Every Professional Engineer in the State is invited to attend.

The ultimate end of education, of science, of technology, of industry, of enterprise, is not learning, or even wisdom, but more particularly human welfare, or human behavior.

Some one has said that America probably contains a great number of potential Newtons, who never had a chance to actually see an apple fall to the ground.

Controversy is said to be the child of ignorance, and we find fewer of them among those thinking men who have the ability to interpret facts clearly. Yes, we do mean professional engineers.

In the old "horse and buggy days" it took the average farmer longer to drive to his "County seat," than today it takes an airplane to fly from New York to China.

The engineer's usefulness to society could be enormously increased if he could be induced to broaden his horizon by applying to the problems of the nation, the same analytical skill he so effectively displays in handling everyday technical matters.

Briefs of Interesting Articles

Young War Engineers

Stressing the practical value of engineering personnel who know how to work effectively with human beings, as well as with the forces of Nature, the Engineering News Record for November 1st points out the significance of this issue at this time when so many young engineers are returning from military service. "Scholastic training is a great asset, which becomes more valuable as each year goes by," says the NE-R, "but the able engineer is the product of such training supplemented by the broader training that comes from having to work for and with other people, from meeting emergencies single-handed, making compromises, and taking defeat standing up. These considerations lead to the conclusion that the years that many young engineers or potential engineers have spent in military service may turn out to be the most significant part of their engineering training. Military service has many drawbacks, but it is a great builder of self-reliant men and men who know how to work with others. The war has taken many potential engineers, but it may offset this by turning others to engineering and by accelerating the maturity of all who enter the engineering field at the end of their military service."

"Liaison With Government"

Under the above title, the Electrical World, in its issue of November 10th, deals with what we feel is always a timely subject. It is easy for all of us to criticize the government. Too often we forget that government agencies have a right to expect some cooperation from citizens. Speaking of the desirability of a two-way working together of business and government, the editorial has this to say, in part:

"If we are to give more than a mere lip service to the principle that government in a democracy is to serve its people and not to rule them, we must do something more than criticize. Time after time, bureau heads, as well as those elected to Congress, have asked business to let them know its problems.

Sometimes business has gone to Washington in large groups to discuss broad policy, and at other times small groups of competitors have, in connection with some bill, taken their specific problems down there. Never in peace time has business gone to the national capital regularly for the purpose of creating a closer bond of mutual understanding . . ."

The editorial closes with this summary: "Government is getting stronger in its regulation of our daily affairs. Business must recognize this trend and do everything it can to encourage a sympathetic and constructive regulation that will provide a political atmosphere toward business that encourages full operation of a free economy."

Public Vs Private Housing

The United States Roofing Contractors' Association has issued a thought-provoking circular entitled, "Wanted — A 10-Years' Housing Plan." While this subject borders on the "technical," from the standpoint of the National Society of Professional Engineers, there is much in this discussion of interest to many Professional Engineers.

Under the head of "Private Versus Public Housing," the Contractors' circular has this comment to make:

"Private enterprise in building has carried on a campaign against public housing, a campaign also based on fear—fear that public housing will drive private building interests out of business. Again the field is so vast that competition does not exist.

"The problem of both public and private housing is that there is not a sufficient supply of labor for either, certainly not for both. If the private building interests can construct 2,000,000 homes so that 30 per cent of them rent for less than $20 a month, or sell for less than $2,000; and that another 24 per cent rent for less than $30, and sell for less than $3,000, with the balance above these figures, then there is no need for public housing. The building industry never has been able to build homes according to such a classification."

The circular concludes with this thought: "Housing is not another competitive product like chewing gum. Housing is in an era of broad public interest and that public interest is paramount."

We "Hang Separately"

The urgency of the need for an overall organization of technologists was never better illustrated than by a recent ruling of the Civil Service Commission on minimum educational requirements for engineers and other technologists who seek positions. The editor of Industrial and Engineering Chemistry recently commented on the Commission's ruling in part as follows:

"According to the new law, the responsibility rests squarely with the Civil Service Commission to decide if minimum educational qualifications are to be required for positions of a scientific, technical or professional nature and if so, the Commission must state publicly its reason or reasons for such action.

No Standards Required

"The American Chemical Society is informed that the Civil Service Commission will require minimum educational qualifications in the case of medical doctors, dentists, veterinarians, teachers, nurses, and some other classifications which very obviously fall within the category of scientific, technical and professional position, but will not demand minimum educational requirements from those who seek positions as chemists, physicists and engineers . . ."

The Professional Engineers, as well as the chemists of the country should protest such a ruling on the part of the Civil Service Commission. But such protests often go unheeded by government agencies, unless they have the backing of numbers from all branches of the profession. The need for an enlarged National Society of Professional Engineers is indeed great.

Book Reviews

MAKING PATENT DRAWINGS

By Harry Radzinsky

Each of the from 750 to 1000 United States patents filed every week requires one or more drawings that must conform to the exact style prescribed by the United States Patent Office.

Mr. Radzinsky's book provides, for the first time, a complete handbook on the preparation of patent drawings. It gives explicit instructions for shading in the form peculiar to patent drawings, for the proper placement of numerals and figures, and all other special techniques in making the required drawings both for patents and for trademarks. It shows, step by step, how the drawings for both simple and complex inventions are made, with many illustrations reproduced from actual drawings from the Patent Office. It gives much practical advice on the use of drawing materials and on drafting techniques, and shows how to avoid faults or defects in drawings which might cause them to be rejected by the Patent Office.

The whole book, reflecting as it does the thorough experience and extensive experience of a patent attorney who has been in active practice for over twenty-five years, provides a valuable reference for patient attorneys, patent departments in industrial concerns, inventors, and all others handling patents, as well as a training in a most profitable field for draftsmen.

114 pages, Cloth, 7½x10¼, Illustrated $3.00
THE MACMILLAN COMPANY

ELECTRONICS DICTIONARY

By Nelson M. Cooke and John Markus

The Electronics Dictionary published by McGraw-Hill is an up-to-date glossary containing readily understandable and accurate definitions of 6,492 terms used in radio, television, industrial electronics, communications, facsimile, sound recording, etc. In view of the extensive development of new terms during recent years, this compilation of authoritative definitions promises to be of great usefulness.

In general, it has been the authors' aim to write definitions understandable to a high-school student, and at the same time useful to the engineer, since each definition is accurate and, in most instances, complete in itself.

The authors have made a serious attempt to standardize the many compound words and phrases used in electronics, and they have used a consistent hyphenating policy throughout. A complete and consistent abbreviating policy is presented for the first time in this book, based upon principles set forth by the American Standards Association. The dictionary is illustrated by 610 appropriate diagrams and sketches.

434 page, Cloth, 6 x 9, Illustrated.....$5.00
McGRAW-HILL BOOK COMPANY, INC.

AL SMITH, AMERICAN

By Frank Graham

This is an informal biography of a man loved by millions. It is a book as informal as Al Smith himself and is the inspiring story of a boy who was born on New York's East Side and grew up to be a great political figure and a great American.

Al Smith was many things in a long and crowded life: newsboy, truck chaser, fishmonger, clerk, process server, Assemblyman, sheriff, Governor of the State of New York, Presidential candidate, and businessman; but above all he was a decent, forthright, outspoken American who once put his simple credo into these words:

"I know what is right. If I ever do anything that is wrong, it will not be because I do not know it to be so and you can mark it down as being wilful and deliberate and hold me to account for it."

There is, in the pages of this intimate story of his life, much of the story of the New York of his youth, of his family and his friends, of the men and women who helped to mold his life—policemen, Bishops, firemen, judges, parish priests, truckmen, political bosses, financiers, and many others from every walk of life.

As his life unfolds, the scene broadens and is peopled with many famous men and great cities: Tom Foley, Charles F. Murphy, Elihu Root, Charles Evans Hughes, William F. Kenny, Jimmy Walker, Jim Farley, John Raskob, Franklin D. Roosevelt, Winston Churchill, and Albany, New York in the Sheriff's Office, Albany in the Governor's Mansion, Baltimore, San Francisco, Houston, Chicago, London, Paris, Rome and the Vatican.

242 pages, Cloth, 5¾ x 8½, Illustrated $2.50
G. P. PUTNAM'S SONS

THEORY OF STRUCTURES

By E. Timoshenko and D. H. Young

In the preparation of this book, the authors have tried to keep in mind the fact that theory of structures is based on mechanics with which the reader is already familiar. Every effort has been made to show him that the methods of analysis used in "Theory of Structures" are only a further development of the general principles of mechanics that he already knows. They believe that this establishment of a close connection between the teaching of mechanics and structures can be most helpful in understanding the various practical methods of analysis of trusses and frames. In fact, such a complete understanding is necessary for a successful application and adaptation of theoretical knowledge to the solution of various practical problems.

The first chapter offers an introduction to the theory of structures in which the basic principles of statics are recapitulated. Succeeding chapters deal with the analysis of statically determinate trusses in one plan, influence lines, formation and analysis of space trusses with hinged joints, principles of mechanics preparatory to the analysis of statically indeterminate structures, methods of calculating deflections of trusses, theory of statically indeterminate trusses, bending of beams and frames, and the theory of arches.

488 pages, Cloth, 6 x 9, Illustrated.....$5.00
McGRAW-HILL BOOK COMPANY, INC.

PRACTICAL DESIGN HANDBOOK FOR ENGINEERS

By Dr. Alois Cibulka

This combination of Textbook-Handbook contains the practical experience of over 30 years gained both in Europe and America. In one handy volume are the charts, tables, formulas, worked out and used by the author in designs of millions of dollars worth of equipment all over the world.

This book originated from the lectures conducted by the author in the classes for Industrial Engineers in the State of Texas. It is an engineering library by itself, useful to any Engineer—Civil, Mechanical, Structural, Industrial, Chemical, Architects, Builders, Mechanics, etc.

358 pages, Paper, 9¼ x 12, Illustrated $6.00
CLARK AND COURTS

What's New

(News from industry — gathered by the publisher)

Requests for further information concerning any item mentioned under this heading will be promptly referred to the manufacturer. It would be appreciated if inquiries be addressed on professional or company letterhead.

SEND INQUIRIES DIRECT TO AMERICAN ENGINEER, #6 CHURCH STREET, NEW YORK, N. Y.

NEW PROCESS OF INTERNAL PLATING MAKES STEEL PIPE CORROSION-RESISTANT

The inside of steel pipe can be electro-plated with nickel or other metals by means of a new process recently developed. The process is relatively inexpensive and is said to be commercially practical in every respect. It develops a smooth, ductile, pore-free nickel deposit fully adherent to the base metal, and it can be applied to pipe or tubing up to 18" overall diameter, in random lengths approximately 20 feet. Use of the process endows steel pipe with the corrosion-resistance of nickel, while retaining the low cost, strength, and fabricating characteristics of the former.

Fittings and pipe line accessories are available for complete piping systems. Welding and fabricating techniques have been fully developed. The internally plated pipe can be welded, reduced and bent, hot or cold, without destroying any portion of the internal lining. In reducing tubing by the cold reduction method, it is now possible to predetermine the actual thickness of the plating throughout the entire reduction, because the applied metal and the base metal reduce in equal ratio.

The piping costs only a fraction as much as solid pipe of corrosion-resistant alloys, making possible substantial savings where alloy pipe has been used heretofore and extending the use of corrosion-resistant material to applications formerly prohibited by the high cost of alloy pipe.

It will find wide use in the production or handling of petroleum, chemicals, foods, textiles, plastics, coke and gas, glue gelatin, paints, varnishes, sugar, paper, pulp, dye stuffs, glass and ceramics.

Bulletins of information and engineering data, now being prepared, will be available for distribution in the very near future.

After every war, so the psychologists say, there is a tendency to turn from violence without, to violence within.

For further information, addreses American Engineer, reference No. 433.

TRIPLE-PURPOSE SCREW DRIVER TOOL

A handy new tool for auto mechanics, maintenance men, assembly line workers, engineers, plumbers, carpenters, and others is now on the market.

It is a new Triple-purpose Screw Driver Tool with a "power-arm" arrangement that gives extra power which unlocks rusted screws an ordinary screw driver cannot budge. In reverse, it makes possible the last quarter-turn pressure needed to tighten screws and make them stay-put. With the power-arm folded back into the handle, the tool becomes a standard type screw driver. This aluminum power-arm is so constructed that when in use it affords a solid horizontal hand support that allows full hand and body pressure to prevent slipping or gashing of screw head. This tool has an aluminum handle; blade is drop-forged steel and plated to ward off rust. The new tool is made in 5" by ¼", 6" x 5/16", 8" by 3/8" length blades.

For further information, address American Engineer, reference No. 434.

SINGLE-ACTING PILE HAMMERS

To call attention to a standard line of single-acting pile hammers a new 16-page bulletin of detailed information was released recently.

This bulletin describes the special purposes for which these single-acting hammers are intended, and lists a number of their superior advantages, including underwater operation, a feature not found in other makes of single-acting hammers.

Specifications, cross-section diagrams and listing of component parts are included, also detailed data on operation. A table based on an established formula for bearing power of piles offers help in selecting the correct size of hammer.

If democracy is to survive, we must marry Reason to Political Power.

For further information, address American Engineer, reference No. 435.

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Managing Editor, *Product Engineering*
and MICHAEL A. BROWN, JR.
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This book gives over a hundred case studies, each one vividly illustrating the use of a particular plastic or fabricating method. This is a book for engineers, designers and businessmen who want facts which have been successfully demonstrated in use. It is a book for men who want concrete answers to practical queries concerning a new material or process: What is it good for? Will it improve the product? Will it increase sales? Will it lower cost? Here, in accurate, understandable, and usable form, are the answers to these as well as a host of other pertinent questions on specific physical properties and mechanical considerations of materials.

This book gives you—

—a working knowledge of plastics
—an intensively-studied review of present and probable future uses of plastic materials
—an idea of the relationship of plastics to metals and other material
—information on the place of plastics in your particular line of activity

• 102 detailed case studies describe how plastics have been adopted in answer to a series of specific problems.

• New developments in materials and processes are covered, including styrene elastomer, stripping coatings, jet molding, etc., and a critical evaluation of their effects on the use of plastics is presented.

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Position .....AE

(Books sent on approval in U. S. only.)

ALL-PURPOSE UTILITY TRUCK

Flexibility is the keynote of this new, patented All-purpose Utility Truck. It is designed for quick and easy handling of parts, equipment and supplies in industrial plants. The manufacturer states that important features of the new truck are short wheelbase making for easy maneuverability, sturdy all-steel construction assuring years of service even with rough and continuous use, plus unusual flexibility providing applications for a variety of jobs.

Smaller than the heavier trucks and wagons now used industrially for the extra heavy loads, the new unit fills the need for a compact, easily maneuvered truck to handle the many odd transport jobs around an industrial plant. This new unit lends itself to use such as materials handling, parts assembly, production line, shipping room, stock storage and dispatch of parts and materials.

Steel bed and platform of the new truck are seamless one-piece construction. All corners are rounded, edges reinforced. Substantial corner guards have been provided to give handle maximum rigidity and protect corners of load. A reinforced steel channel runs beneath the bed of the truck giving it a tremendous "falling weight." The manufacturer claims that seventy-five to one hundred pound weights can be dropped on the bed of this truck without impairing its life or durability.

The bed or base of the truck is 23-1/8" wide and 33-3/8" long. Height of truck from floor to handle, is 36". The four steel disk wheels are ball bearing and can be supplied in either 8" or 10" sizes with rubber tires or 10" with plastic tired wheels. The front wheels are stationary, the rear wheels swivel. The rubber tires are noiseless and are recommended by the manufacturer for the lighter loads of 500-600 lbs. While the truck is easy to handle even with much heavier loads, the manufacturer recommends that plastic wheels be specified when heavy loads are anticipated.

For further information, address American Engineer, reference No. 436.

HOLDER FOR BROKEN HACK SAW BLADES

Designed to cut down the discard of broken lengths of hack saw blades, this Hack Saw Blade Holder also accommodates thin flat file sections. By its use, craftsmen or workmen of all kinds can now find a multitude of uses for their old or broken cutting blades.

Utmost simplicity characterizes the device. It is a single unit tool composed of a tubular handle with an extended positive grip nose for securing the working point of the blade or file. The ends of the handle are slotted to receive inserted blades. Almost any length blade can be held securely.

Many workmen make their own knives or scrapers by grinding old blades to shape. The new holder is an ideal handle for these tools. In addition to saving expensive material, the holder simplifies many operations such as key-hole sawing and is perfectly suited for tool and die makers.

For further information, address American Engineer, reference No. 437.

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Every ASD dredge is designed as a complete, integrated unit for economical performance. Backed by 40 years of dredge building experience, these units are cutting yardage costs on many different projects—canals, harbors, drainage, sand, gravel, fills, ore recovery and other jobs.

Patented, bolted sectional steel hulls, all machinery and accessories are shipped by rail, truck or as hold cargo for assembly at site of use. May be dismantled, shipped and reassembled.

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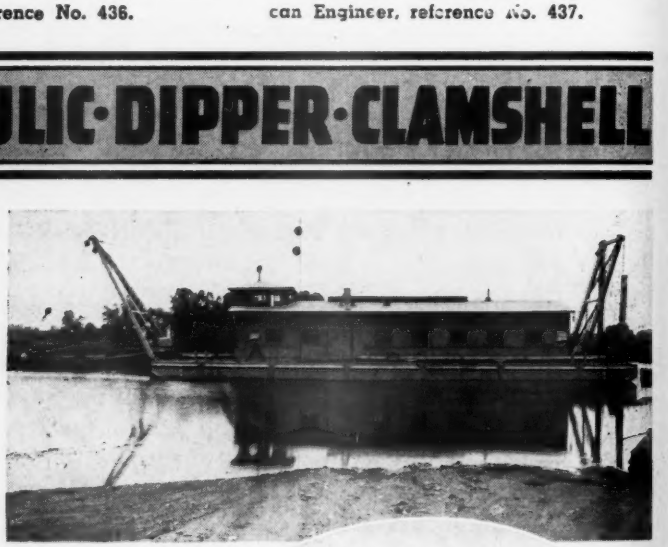

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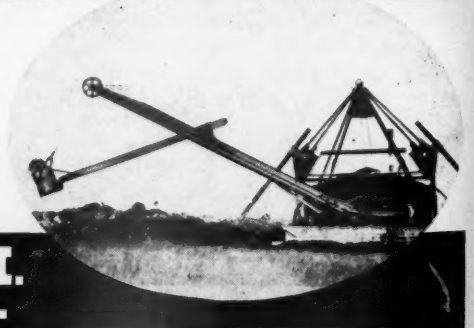

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ROADBUILDERS' EQUIPMENT

Four new developments, which will be of material help to roadbuilders, are announced. They include a widening finisher, a precision subgrader, a segregation eliminator, and a concrete paving conveyor.

The Widening Finisher, intended primarily for widening work on concrete paving construction, is simple and inexpensive to operate. It is of the single screed type and can accommodate widths from 2 to 6 feet. It has two traction speeds, forward and reverse, and there are two screed speeds to allow for concrete of different textures. The machine can be used for building concrete sidewalks.

The Precision Subgrader employs an entirely new principle of cutting the subgrade for paving construction to the exact elevation and shape required by the specifications. The precision subgrader leaves the subgrade as firmly compacted as the original prepared grade, and thus eliminates the need for subsequent compacting of the subgrade by rolling.

Flexibility of operation is one of the characteristics of the new machine. It will be available in widths adjustable for half-width and full-width paving operations. The capacity of the precision subgrader in completed subgrade will keep pace with the accelerated rate of production.

The Segregation Eliminator was originally developed to prevent the tendency of coarse aggregates to segregate as they are discharged from overhead storage bins. The eliminator is simple and inexpensive, and can be installed in each of the coarse aggregate compartments of the overhead storage bin. It is adjustable in its operation and automatic in its functioning.

Coarse aggregates, such as gravel, slag, and crushed stone, undergo segregation as they are deposited in overhead storage bins from clamshell buckets, conveyors, screens, and the like. The segregation eliminator corrects whatever segregation takes place while the bins are being filled, and delivers a uniformly graded aggregate from the discharge gate at the bottom of the bin compartment.

The multiple compartment storage bins for central mixing plants, truck mixer loading plants and batching plants for road or bridge work made by the manufacturer will include provisions for the installations of the segregation eliminator in the coarse aggregate compartments of the storage bin, when required or specified.

The Concrete Paving Conveyor is a portable conveyor for concrete paving construction which rides the forms ahead of the concrete paving spreader and finishing machine, receives the concrete from truck mixers, and deposits the concrete within the paving area.

The problem which this machine helps to solve has been one which has always been troublesome in the field of paving construction. Concrete from the truck mixers should be placed between the forms in proper position from whence it can be spread rapidly and economically. Paving mixes usually dry will not flow down the discharge chute of the truck mixer without manual assistance.

The problem is overcome by the new portable paving conveyor in the following manner. The conveyor receives the concrete in a collecting hopper which is cantilevered beyond the side form. There it is in a position to receive the discharge from truck mixers while they are parallel to the longitudinal axis of the paving operation. The concrete is conveyed laterally and deposited within the paving area. In half-width construction, the concrete is deposited

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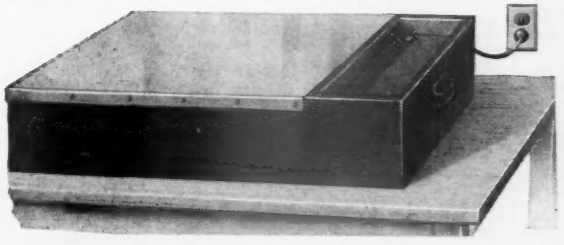
THE B-T PORTABLE LIGHT BOX



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Size of glass in the above model is 24" x 20". The Beattie Light Box is available in two other models: the Suit Case Model—with viewing glass 17" x 14", and the Drafting Room Desk Model—with viewing glass 31" x 27". Other sizes can be made to special order.

Write for full specifications and prices of stock models or of any special size you are interested in.

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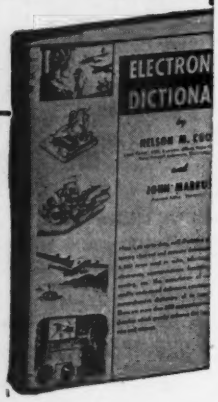

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TUBING FITTINGS WHICH ELIMINATE END PREPARATION

A line of time-saving Tubing Fittings which eliminate end preparation or soldering of the tubing and yet produces a stronger, leakproof and flexible joint has just been announced The fittings, made in standard sizes from 1/8" to 1½" O.D., consist of four parts—the body, a gripping ring, synthetic rubber gasket and nut. To attach the fitting, the nut (with gasket and ring inside) is slipped over any plain-end tube, cut to desired length. The tubing end is inserted into the body as far as it will go and the nut tightened. Tightening the nut compresses the ring into a tight grip and moulds the gasket around the ring for a leak-proof seal that is so flexible it will withstand unusual vibration or impulse.

According to the manufacturer, the elimination of flaring, swedging, or soldering the tube end adds considerably to the strength of the joint as well as saving time and labor and economies in time and material are also considerable over the collar, ring or ferrule type of tube-end fitting. The new tubing fittings are available in brass, aluminum or steel.

For further information, address American Engineer, reference No. 439.

LABORATORY SPRAY DRYER

This Laboratory Spray Dryer is a ready tool for testing the applicability of spray drying to new products and the development of shorter processes for present products. Samples of dried product can be obtained from as little as a quart or two of liquid.

Spray drying is a versatile process. Particle size, density, moisture content, solubility and other characteristics are all subject to control. If the product is delicate or heat sensitive, short exposure time to the drying medium is important. In a spray dryer, the product is in the drying chamber only a few seconds. The temperature of the material during the drying process does not exceed the wet bulb temperature of the drying air.

Test runs on any special material on either the Laboratory Dryer or the large commercial spray driver can be arranged.

For further information, address American Engineer, reference No. 440.

HEAVY-DUTY MACHINE-CUTTING BLOWPIPE

A new heavy-duty, oxy-acetylene, machine-cutting blowpipe, has been developed. This new blowpipe, which cuts steel ranging in thickness from 16 in. to 50 in., is particularly suited for hot top cutting, ingot slitting, riser cutting, cutting large forgings, and scrap cutting in many applications where the oxygen lance was formerly required.

The blowpipe is water cooled and is intended to be mounted on a heavy-duty, straight-line cutting machine. A 50-lb. gauge is attached to the blowpipe body for checking cutting-oxygen pressures which are unusually low — never over 35 lb. per sq. in. The blowpipe is designed for operating with medium-pressure acetylene and will operate satisfactorily on a generator or a manifold having a minimum hourly capacity of 500 cu. ft. of acetylene. Unless cutting oxygen is supplied from a pipe line, at least 10 cylinders should be manifolded to provide sufficient capacity. In shops where steel over 18 in. thick must be cut frequently, the C-45 blowpipe provides a tool for making these cuts quickly and economically.

Also available is a blowpipe holder, designed especially for this blowpipe. It provides ease, accuracy, and stability in making vertical and angular adjustments. Vertical adjustment is obtained by turning a ball crank which operates a worm and gear that meshes with the blowpipe rack. A total angular adjustment of 135 deg. can be obtained in the plane of the cut.

For further information, address American Engineer, reference No. 441.

FILMS TO HELP TEACH MATHEMATICS

A series of 24 discussional type slidefilms, "Light On Mathematics", has been produced and is now being distributed. These visual teaching aids are for introductory, refresher or review purposes. Kit 1 covers Arithmetic, Kit 2 Geometry, Kit 3 Algebra and Kit 4 Graphs—a total of 1,087 individual teaching pictures.

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RAPID WATER ANALYSIS APPARATUS

A new apparatus which furnishes the plant operator and laboratory technician with a rapid, precise method for the determination of hardness, calcium and magnesium in waters, both industrial and potable is now obtainable. It is also widely applicable to water problems in the process industries.

According to the manufacturer, false endpoints are absent, and air agitation eliminates tedious and arm breaking shaking by hand. The accuracy is comparable with lengthy and laborious gravimetric methods, and substances ordinarily present in water do not interfere at all.

The apparatus is so simple that any operator can readily master its operation. It makes use of a new endpoint, based on the foam-meter principle. This endpoint is unmistakable and is reproducible with a high degree of precision. Determinations are made within ten minutes and there is no waiting time to observe stability of lather. The operation is foolproof and gives identical results with different operators.

The instrument is supplied calibrated and ready for assembly and use. There are no moving parts to wear out and no delicate features to go out of adjustment. All vital parts are of durable plastic construction.

This new method of water analysis is devoid of the inherent and personal errors of conventional hardness analysis procedures. It effectively supplants the standard soap method for all uses, but it does much more—not only is it definitely more precise and rapid, it is also readily usable with waters which resist analysis by the traditional soap method. The ratio of calcium and magnesium present does not affect the determination; there is a single endpoint for stoichiometrically equivalent quantities of calcium and magnesium, regardless of the relative amounts present in the water.

Samples of 50 ml. or less are required. This is in contrast with gravimetric methods involving evaporation of one-half liter or more and subsequent precipitation waiting periods. The apparatus is equally at home in the field and in the plant. Chemists will find it a precision instrument thoroughly reliable in research work of the highest order. So well does it function in the presence of interfering substances that it can be used directly with samples which contain chlorides up to 2,000 ppm. Sulfates up to 1,000 ppm are also without effect. Large iron concentrations, and the treating and conditioning chemicals and compounds used in boiler waters do not interfere.

The versatility of the new apparatus is further demonstrated by the ease with which micro determination of calcium and magnesium in boiler scales, minerals, plant ash, rocks, sediments, and similar materials is made. In many cases these determinations are carried out in the presence of practically all the impurities in the samples. They are simple, accurate and reproducible.

For further information, address American Engineer, reference No. 443.

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An improved Gearless Pump for water, light oil or other liquid circulating use has been introduced. One feature of the new pump is the fact that it is equipped with special bearings which require only water lubrication, eliminating the need for grease cups. No adjustments are needed. All metal is of bronze. The pump can be used in oil, or fresh or salt water, and can be easily installed. It can be mounted at any angle and operated in either direction with equal efficiency. Dependable and durable, it prevents motor failures and jamming or breaking of gears is avoided.

The impeller, which is a removable unit, is of tough resilient material composed of several layers of laminated sections, vulcanized together under great pressure. It enables sandy, muddy, or gritty particles to pass without harm to the pump should they get in the water or oil system. The new pump is available with single impeller and standard ½" connection and double impeller with standard 1" connection.

For further information, address American Engineer, reference No. 444.

SOAPLESS CLEANER

An all-purpose Soapless Cleaner which is claimed to form suds instantly in hard, soft or sea water and effectively clean everything from delicate hosiery and woolens to grease-caked heavy machinery is now available to industrial users. It will be distributed through recognized jobbers, supply houses and sales representatives.

This cleaner contains no abrasive and is entirely soluble. Every ingredient is an active useful detergent. Exhaustive on-the-spot working tests for more than three years have revealed, the manufacturer declares, the adaptability of the new cleaner to hundreds of industries. Wartime usage by shipping and marine operators showed that the solvent is effective in cutting away grease and grime from marine engines and cargo areas. Mixed with sea water it was used to remove oil slick in basins and drydocks, while in heavy steel industries, it cleaned large castings and grease-coated machinery more effectively than acid.

For further information, address American Engineer, reference No. 445.

CONVERSION FACTORS AND FORMULAS FOR ELECTRICAL ENGINEERS

An eight-page folder "Conversion Factors and Formulas for Electrical Engineers" has just been published. It contains over 600 conversion factors commonly used by electrical engineers as well as definitions of basic electrical units, prefixes, mensuration and temperature conversion factors. The lists are arranged for use in a loose-leaf binder or for desk or wall mounting. Conveniently indexed, a wealth of electrical information is made instantly available. The factor tables have been lacquered to add durability.

For further information, address American Engineer, reference No. 446.

GASOLINE HOSE AND FITTINGS

A new folder on its Gasoline Hose and Fittings has just been published and is now available upon request. The folder describes and pictures the operating advantages of tank truck hose with oil and gasoline proof synthetic rubber tube and cover, as well as all the fittings needed for its use.

For further information, address American Engineer, reference No. 447.

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INSULATED VARIABLE TEMPERATURE AND HUMIDITY CHAMBER

A new Insulated Variable Temperature and Humidity Chamber for the simulation and control of atmospheric conditions has been announced and is now available in laboratory and production sizes.

The cabinets are scientifically designed to provide accurate simulation and control of any desired temperature, humidity and air circulation condition in laboratory or production testing operations. Simple and fool-proof in construction. Batches or parts can be tested under standard or variable conditions. Temperature, humidity and air circulation can be controlled to close pre-selected limits.

Conditioned air is kept in continuous forced circulation without undesirable draft. Uniform wet and dry bulb temperatures throughout the cabinet are thus provided.

Dry bulb temperature of the air can be set from room temperature to any desired point. When unit is operating, this temperature does not vary in any part of cabinet by over 1°C. plus or minus.

Relative humidity can be controlled up to 90% and atmosphere will not vary over plus or minus 1/2°C. from the wet bulb of the humidity required.

Glass doors permits inspection of contents without exposure of same to outside air. Under any set conditions, temperature and humidity will remain constant during operation. A simple resetting of controls brings cabinet to a new equilibrium within ten to fifteen minutes.

For further information, address American Engineer, reference No. 448.

Now . . . a new approach to electrical transients—

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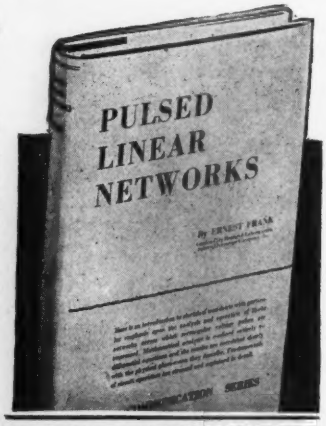
Here is a new approach to the fundamentals of transient analysis, presenting a general method of analysis in terms of mathematical concepts *familiar* to the electrical engineer. This is done by use of differential equations whose scope is extended to provide an effective means of solving transient problems.

Mathematical results are correlated closely with the physical operations they describe. Emphasis is on the basic principles of circuit operation, and on establishing a *method* of analysis widely applicable, yet based on familiar mathematical concepts.



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—an understanding of the basic factors governing transient behavior of electrical networks
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—mathematical derivations to clarify the logical development of results

CONTENTS

1. Introduction
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3. Series Networks Containing Resistance and Capacitance
4. Series Networks Containing Resistance and Inductance
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MOBILE LOAD HANDLING DEVICE

A new mobile load handling device of 2,000 pounds capacity which provides a complete load handling unit that operates on the floor is now on the market. It is available as a complete unit or as an assembly which includes all parts to build the Gantry "A" Frame except the I-Beam which may be obtained locally.

When purchased as an assembly, the Gantry "A" Frame may be completed in one hour. The design is such that the I-Beam may be mounted on top of the Gantry legs or suspended from them.

The Gantry "A" Frame legs are formed from steel pipe welded into rigid one-piece units, and mounted on heavy duty industrial casters equipped with anti-friction bearings and ball bearing thrusts to insure easy movement and free swiveling.

Outstanding advantages claimed are maximum rigidity with light weight —the complete assembly weighs but 270 pounds, and it is arranged so that the entire space between the Gantry legs may be served because the inside faces of them are vertical their entire height.

The principal dimensions of the completed Gantry "A" Frame with the I-Beam mounted on top of the legs are—over-all height 10 ft. 0″; clear space beneath the I-Beam 3 ft. 6″; clear space the entire height between the inside of Gantry legs 9 ft. 4-3/8″; width at floor 5 ft. 4″, and length over-all 12 ft. 6″. The frame is designed so that either a Chain Block or Electric Hoist suspended from an I-Beam Trolley may be employed as the hoisting unit.

For further information, address American Engineer, reference No. 449.

THERMOCOUPLE DATA BOOK

A new Thermocuple Data Book and Catalog has just come off the press. Containing 32 pages, it gives information on selection of proper thermocouples and carries installation aids. It describes and lists prices and recommendations on thermocouples, thermocouple wire, lead wire, heads, connectors, plug and socket assemblies, insulators, and protecting tubes.

For further information, address American Engineer, reference No. 450.

This famous advertisement first appeared in 1919, and its message is more potent than ever today!

The years that the locust hath eaten—

A SOLEMN sounding line it is, full of sad significance.

The years when there were no crops, because they were destroyed by the enemies of crops. The years when men worked and made no progress; when the end of the year found them a little poorer than its beginning, because a part of their little span of life was gone and had produced no increase.

In almost every life there are some fruitless years; but the tragedies occur, when year after year, men go along feeding their lives to the locust of indecision, or the locust of laziness, or the locust of too great concentration on a petty task.

In every week of every year the Alexander Hamilton Institute is brought into contact with such tragedies.

IN a very old book named Joel, after the man who wrote it, you will find this line,

"The Years that the Locust hath Eaten."

"If I had enrolled with you a year or two ago, I should be better able to handle the problems put up to me every day," another says.

He is making progress now, rapid progress. But the progress might just as well have started two years earlier.

The punishment of wasted years

THIS happened just the other day. A man wrote asking that some one call on him who could give him detailed information as to just how the Alexander Hamilton Institute has helped thousands of men to greater success.

The representative found a man past fifty years of age, occupying a routine position in a great corporation. He sat down to explain the Institute's aim and method. And as he talked, something rose and swelled in the man's throat. Tears welled into his tired eyes. He looked across at the representative, and his voice was plainly disturbed by emotion.

The representative of the Institute turned away his eyes, to leave what that man was thinking. His thoughts were turned back across the divide of years to his opportunity, as was gripped by the thought of the years that the locust hath eaten.

To-day you may start forward with the hosts of others.

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"Forging Ahead in Business"

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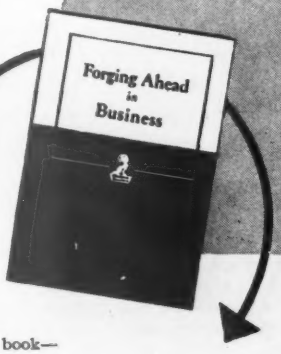

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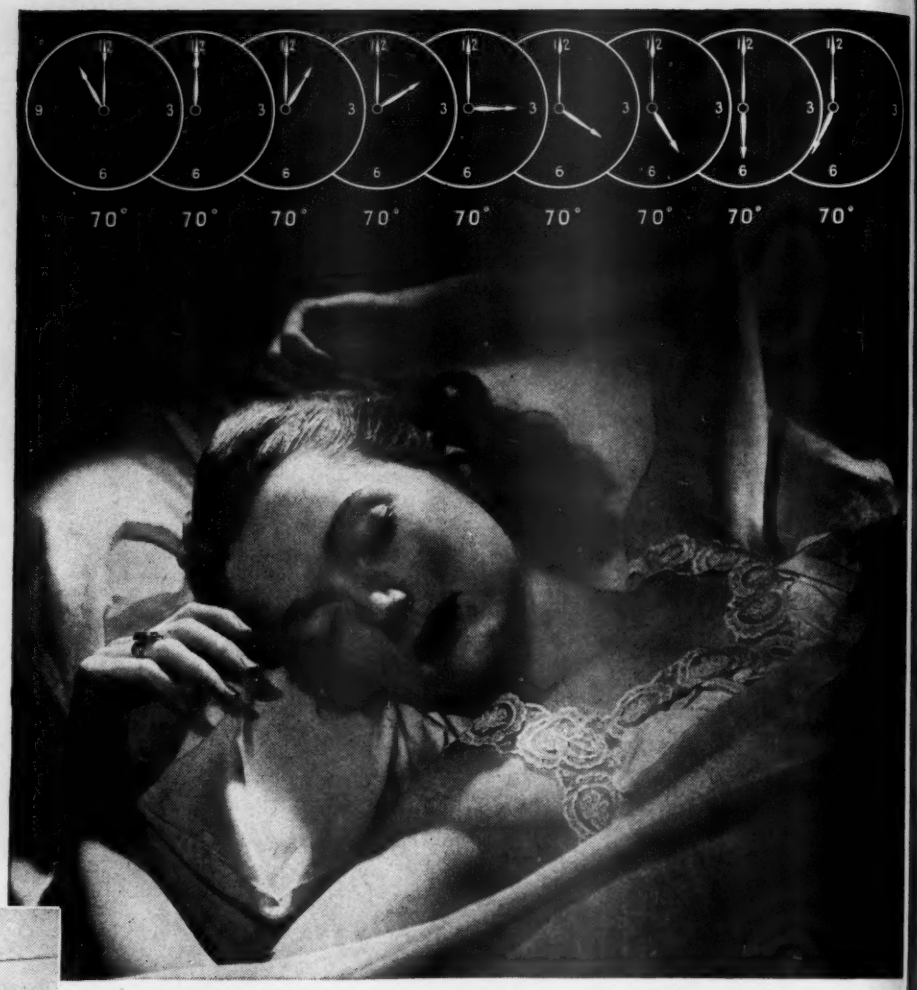

She likes to sleep "snug as a bug in a rug" on zero nights. Her husband is a ruggeder, warmer-blooded sort. But a feather-weight G-E automatic blanket for each is perfect—for these blankets can be adjusted to keep beds at any degree of warmth evenly all night long, despite temperature changes. G-E automatic blankets are made according to the same principle that keeps high-altitude flying suits "electrically warm" even at 60° F. below zero.

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